IEI Technology Corp.

MODEL:

KINO-9654G4

Mini-ITX LGA775 Intel® Core™2 Extreme Motherboard

VGA, Four PCIe GbE, USB 2.0, SATA II

User Manual

Rev. 1.02 – 20 May, 2009

RoHS Lead Free

Revision

Date	Version	Changes
20 May, 2009	1.02	Modified RJ-45 Ethernet connector LED indicator information
August, 2007	1.01	Modified GbE driver installation
July, 2007	1.00	Initial release

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Packing List

NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the KINO-9654G4 motherboard from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

The items listed below should all be included in the KINO-9654G4 motherboard package.

- 1 x KINO-9654G4 single board computer
- 1 x Mini jumper pack
- 1 x ATA66/100 IDE flat cable (P/N: 32200-008800-RS)
- 2 x SATA cable (P/N: 32000-062800-RS)
- 1 x SATA power cable (P/N: 32100-088600-RS)
- 1 x RS-232 cable (P/N: 32200-000049-RS)
- 1 x I/O shielding
- 1 x Utility CD
- 1 x QIG (Quick Installation Guide)

Images of the above items are shown in **Chapter 3**.

Table of Contents

1 INTRODUCTION 2

1.1 KINO-9654G4 OVERVIEW 3

1.1.1 KINO-9654G4 Applications 3

1.1.2 KINO-9654G4 Benefits 3

1.1.3 KINO-9654G4 Features 4

1.2 KINO-9654G4 BOARD OVERVIEW 5

1.2.1 KINO-9654G4 Connectors 6

1.2.2 Technical Specifications 7

2 DETAILED SPECIFICATIONS 9

2.1 OVERVIEW 10

2.2 DIMENSIONS 10

2.2.1 Board Dimensions 10

2.2.2 External Interface Panel Dimensions 11

2.3 DATA FLOW 12

2.4 COMPATIBLE PROCESSORS 13

2.4.1 Intel® Core™2 Extreme Features 13

2.4.2 Intel® Core™2 Quad Features 13

2.4.3 Intel® Core™2 Duo Features 14

2.4.4 Intel® Pentium® D Features 14

2.4.5 Intel® Celeron® D Features 14

2.5 INTEL® Q965 NORTHBRIDGE CHIPSET 15

2.5.1 Intel® Q965 Overview 15

2.5.2 Intel® Q965 Memory Support 15

2.5.2.1 Intel® Q965 Analog CRT Support 16

2.5.3 Intel® Q965 PCIe x16 17

2.5.3.1 PCIe x16 Bus Overview 17

2.5.3.2 PCIe x16 Bus Specifications 17

2.5.4 Intel® Q965 Direct Media Interface (DMI) 18

2.6 INTEL® ICH8 SOUTHBRIDGE CHIPSET 19

2.6.1 Intel® ICH8 Overview 19

2.6.2 Intel® High Definition Audio 20
2.6.3 Intel® ICH8 PCIe Ports 20
2.6.4 Intel® ICH8 Low Pin Count (LPC) Interface 20
2.6.5 Intel® ICH8 Real Time Clock 20
2.6.6 Intel® ICH8 SATA Controller 20
2.6.7 Intel® ICH8 USB Controller 21
2.7 INTEL® ICH8 PCIE BUS COMPONENTS 21
2.7.1 PCIe Gigabit Ethernet (GbE) Controller 21
2.8 LPC BUS COMPONENTS 22
2.8.1 LPC Bus Overview 22
2.8.2 BIOS Chipset 22
2.8.3 Super I/O chipset 22
2.8.3.1 Super I/O LPC Interface 23
2.8.3.2 Super I/O 16C550 UARTs 23
2.8.3.3 Super I/O Enhanced Hardware Monitor 23
2.8.3.4 Super I/O Fan Speed Controller 24
2.8.3.5 Super I/O Keyboard Controller 24
2.9 ENVIRONMENTAL AND POWER SPECIFICATIONS 24
2.9.1 System Monitoring 24
2.9.2 Operating Temperature and Temperature Control 25
2.9.3 Power Consumption 25

3 UNPACKING 27

3.1 ANTI-STATIC PRECAUTIONS 28
3.2 UNPACKING 28
3.2.1 Unpacking Precautions 28
3.3 UNPACKING CHECKLIST 29
3.3.1 Package Contents 29
3.3.2 Optional Components 31

4 CONNECTORS AND JUMPERS 32

4.1 PERIPHERAL INTERFACE CONNECTORS 33
4.1.1 KINO-9654G4 Layout 33
4.1.2 Peripheral Interface Connectors 34
4.1.3 Rear Panel Connectors 35

4.2 INTERNAL PERIPHERAL CONNECTORS 35
4.2.1 Audio Connector (10-pin) *35*
4.2.2 CPU 12V Power Connector *36*
4.2.3 Fan Connectors *37*
4.2.4 Front Panel Connector *38*
4.2.5 Digital Input/Output Connector *40*
4.2.6 IDE Connector *41*
4.2.7 IR Interface Connector *42*
4.2.8 PCI Express x16 Slot *43*
4.2.9 ATX Power Connector *46*
4.2.10 Serial Port Connector *47*
4.2.11 SATA Drive Connectors *48*
4.2.12 SPI Connector *49*
4.2.13 Internal USB Connector *50*
4.3 EXTERNAL INTERFACE CONNECTORS 51
4.3.1 CRT Connector *51*
4.3.2 Ethernet Connectors *52*
4.3.2.1 LAN1 and LAN2 LED Indicators 53
4.3.2.2 LAN3 and LAN4 LED Indicators 54
4.3.3 Keyboard/Mouse Connector *54*
4.3.4 Serial Port Connectors *55*
4.3.5 USB Connectors *56*

5 INSTALLATION AND CONFIGURATION 58

5.1 ANTI-STATIC PRECAUTIONS 59
5.2 INSTALLATION CONSIDERATIONS 60
5.2.1 Installation Notices *60*
5.2.2 Installation Checklist *61*
5.3 CPU, CPU COOLING KIT AND DIMM INSTALLATION 62
5.3.1.1 LGA 775 CPU Installation 62
5.3.2 Socket LGA775 Cooling Kit Installation *66*
5.3.3 DIMM Installation *68*
5.4 JUMPER SETTINGS 69
5.4.1 Clear CMOS Jumper *70*
5.5 CHASSIS INSTALLATION 71

5.5.1 Airflow *71*
5.6 INTERNAL PERIPHERAL DEVICE CONNECTIONS 72
5.6.1 Peripheral Device Cables *72*
5.6.2 ATA Flat Cable Connection *72*
5.6.3 SATA Drive Connection *73*
5.6.4 Single RS-232 Cable *74*
5.7 EXTERNAL PERIPHERAL INTERFACE CONNECTION 75
5.7.1 PS/2 Keyboard and Mouse Connection *75*
5.7.2 RJ-45 Ethernet Connection *76*
5.7.3 Serial Device Connection *77*
5.7.4 USB Connection (Dual Connector) *78*
5.7.5 VGA Monitor Connection *79*

6 AMI BIOS SETUP 81

6.1 INTRODUCTION 82
6.1.1 Starting Setup *82*
6.1.2 Using Setup *82*
6.1.3 Getting Help *83*
6.1.4 Unable to Reboot After Configuration Changes *83*
6.1.5 BIOS Menu Bar *83*
6.2 MAIN 84
6.3 ADVANCED 85
6.3.1 CPU Configuration *86*
6.3.2 IDE Configuration *87*
6.3.2.1 IDE Master, IDE Slave 89
6.3.3 Super IO Configuration *95*
6.3.4 Hardware Health Configuration *98*
6.3.5 AHCI Configuration *99*
6.3.6 APM Configuration *100*
6.3.7 Remote Access Configuration *102*
6.3.8 USB Configuration *105*
6.4 PCI/PNP 107
6.5 BOOT 110
6.5.1 Boot Settings Configuration *110*
6.6 SECURITY 113

6.7 CHIPSET 114
6.7.1 NorthBridge Configuration *115*
6.7.2 SouthBridge Configuration *118*
6.8 EXIT 119

7 SOFTWARE DRIVERS 121

7.1 AVAILABLE SOFTWARE DRIVERS 122
7.2 DRIVER CD AUTO-RUN 122
7.3 CHIPSET DRIVER INSTALLATION 124
7.4 INTEL GRAPHICS MEDIA ACCELERATOR DRIVER INSTALLATION 126
7.5 BROADCOM LAN DRIVER (FOR GBE LAN) INSTALLATION 130
7.6 REALTEK HD AUDIO DRIVER (ALC883) INSTALLATION 135
7.6.1 BIOS Setup *135*
7.6.2 Driver Installation *135*
7.7 SATA RAID DRIVER INSTALLATION 141
7.8 IDE CONTROLLER INSTALLATION 147

A BIOS CONFIGURATION OPTIONS 153

A.1 BIOS CONFIGURATION OPTIONS 154

B DIO INTERFACE 157

B.1 DIO INTERFACE INTRODUCTION 158
B.2 DIO CONNECTOR PINOUTS 158
B.3 ASSEMBLY LANGUAGE SAMPLES 158
B.3.1 Enable the DIO Input Function *158*
B.3.2 Enable the DIO Output Function *159*

C WATCHDOG TIMER 160

D HAZARDOUS MATERIALS DISCLOSURE 163

D.1 HAZARDOUS MATERIAL DISCLOSURE TABLE FOR IPB PRODUCTS CERTIFIED AS ROHS COMPLIANT UNDER 2002/95/EC WITHOUT MERCURY 164

List of Figures

Figure 1-1: KINO-9654G4 Board Overview 5
Figure 2-1: KINO-9654G4 Dimensions (mm) 10
Figure 2-2: External Interface Panel Dimensions (mm) 11
Figure 2-3: Data Flow Block Diagram 12
Figure 2-4: 240-pin DIMM Socket 16
Figure 2-5: PCIe x16 Socket 17
Figure 2-6: Ethernet Controllers 21
Figure 4-1: Connector and Jumper Locations 33
Figure 4-2: Audio Connector Pinouts 36
Figure 4-3: CPU 12V Power Connector Location 37
Figure 4-4: Fan Connector Locations 38
Figure 4-5: Front Panel Connector Location 39
Figure 4-6: Digital I/O Connector Location 40
Figure 4-7: IDE Device Connector Location 41
Figure 4-8: IR Connector Location 43
Figure 4-9: PCI Express x16 Slot Location 44
Figure 4-10: Power Connector Location 46
Figure 4-11: Serial Port Connector Location 47
Figure 4-12: SATA Drive Connector Locations 48
Figure 4-13: SPI Connector Location 49
Figure 4-14: Internal USB Connector Location 50
Figure 4-15: KINO-9654G4 External Interface Connectors 51
Figure 4-16: VGA Connector 52
Figure 4-17: LAN 1 and LAN 2 Ethernet Connector 53
Figure 4-18: LAN 3 and LAN 4 Ethernet Connector 54
Figure 4-19: PS/2 Pinouts 55
Figure 4-20: External Serial Port Connector 56
Figure 5-1: Intel LGA775 Socket 63

Figure 5-2: Remove the CPU Socket Protective Shield....64
Figure 5-3: Open the CPU Socket Load Plate....64
Figure 5-4: Insert the Socket LGA775 CPU....65
Figure 5-5: IEI LGA-775 Cooling Kit....66
Figure 5-6: Securing the Heat sink to the PCB Board....67
Figure 5-7: Installing a DIMM....68
Figure 5-8: Jumpers....69
Figure 5-9: Jumper Location....70
Figure 5-10: IDE Cable Connection....73
Figure 5-11: Single RS-232 Cable Installation....74
Figure 5-12: PS/2 Keyboard/Mouse Connector....76
Figure 5-13: RJ-45 Ethernet Connector....77
Figure 5-14: Serial Device Connector....78
Figure 5-15: USB Connector....79
Figure 5-16: VGA Connector....80
Figure 7-1: Introduction Screen....123
Figure 7-2: Available Drivers....123
Figure 7-3: Chipset Driver Installation Program....124
Figure 7-4: Chipset Driver Installation Welcome Screen....124
Figure 7-5: Chipset Driver Installation License Agreement....125
Figure 7-6: Chipset Driver Readme File Information....125
Figure 7-7: Chipset Driver Installation Complete....126
Figure 7-8: Select the Operating System....127
Figure 7-9: VGA Driver....127
Figure 7-10: Intel® Graphics Media Accelerator InstallShield Wizard....128
Figure 7-11: InstallShield Wizard Extracting Files....128
Figure 7-12: Intel® Graphics Media Accelerator Driver Welcome Screen....129
Figure 7-13: Intel® Graphics Media Accelerator Driver License Agreement....129
Figure 7-14: Intel® Graphics Media Accelerator Driver Installing Notice....130
Figure 7-15: Intel® Graphics Media Accelerator Installation Complete....130
Figure 7-16: Windows Control Panel....131
Figure 7-17: System Icon....132

Figure 7-18: Device Manager Tab 132
Figure 7-19: Device Manager List 133
Figure 7-20: Search for Suitable Driver 134
Figure 7-21: Locate Driver Files 134
Figure 7-22: Location Browsing Window 135
Figure 7-23: Select the Audio CODEC 136
Figure 7-24: Select the OS 137
Figure 7-25: Select the OS Version 137
Figure 7-26: Locate the Setup Program Icon 138
Figure 7-27: The InstallShield Wizard Starts 138
Figure 7-28: Preparing Setup Screen 139
Figure 7-29: InstallShield Wizard Welcome Screen 139
Figure 7-30: Audio Driver Software Configuration 140
Figure 7-31: Installation Wizard Updates the System 140
Figure 7-32: Restart the Computer 141
Figure 7-33: SATA RAID Driver Installation Program 142
Figure 7-34: SATA RAID Setup Program Icon 143
Figure 7-35: InstallShield Wizard Setup Screen 143
Figure 7-36: Matrix Storage Manager Setup Screen 144
Figure 7-37: Matrix Storage Manager Welcome Screen 144
Figure 7-38: Matrix Storage Manager Warning Screen 145
Figure 7-39: Matrix Storage Manager License Agreement 145
Figure 7-40: Matrix Storage Manager Readme File 146
Figure 7-41: Matrix Storage Manager Setup Complete 146
Figure 7-42: Access Windows Control Panel 147
Figure 7-43: Double Click the System Icon 148
Figure 7-44: Double Click the Device Manager Tab 149
Figure 7-45: Device Manager List 150
Figure 7-46: Search for Suitable Driver 151
Figure 7-47: Locate Driver Files 151
Figure 7-48: Location Browsing Window 152

List of Tables

Table 1-1: Technical Specifications 8
Table 2-1: Power Consumption 26
Table 3-1: Package List Contents 30
Table 3-2: Optional Components 31
Table 4-1: Peripheral Interface Connectors 34
Table 4-2: Rear Panel Connectors 35
Table 4-3: Audio Connector Pinouts 36
Table 4-4: CPU 12V Power Connector Pinouts 37
Table 4-5: CPU Fan Connector Pinouts 38
Table 4-6: System Fan Connector Pinouts 38
Table 4-7: Front Panel Connector Pinouts 39
Table 4-8: Digital I/O Connector Pinouts 40
Table 4-9: IDE Connector Pinouts 42
Table 4-10: IR Connector Pinouts 43
Table 4-11: PCIe x16 Side A Pinouts 45
Table 4-12: PCIe x16 Side B Pinouts 45
Table 4-13: Power Connector Pinouts 47
Table 4-14: Serial Port Connector Pinouts 48
Table 4-15: SATA Drive Connector Pinouts 49
Table 4-16: SPI Connector Pinouts 49
Table 4-17: USB45 Pinouts 50
Table 4-18: VGA Connector Pinouts 52
Table 4-19: Ethernet Connector Pinouts 53
Table 4-20: LAN 1 and LAN 2 Ethernet Connector LEDs 53
Table 4-21: LAN 3 and LAN 4 Ethernet Connector LEDs 54
Table 4-22: PS/2 Connector Pinouts 55
Table 4-23: External Serial Port Pinouts 56
Table 4-24: External USB Connector Pinouts 57

Table 5-1: Jumper....70
Table 5-2: Clear CMOS Jumper Settings....71
Table 5-3: IEI Provided Cables....72
Table 6-1: BIOS Navigation Keys....83

List of BIOS Menus

Menu 1: Main.....84
Menu 2: Advanced.....86
Menu 3: CPU Configuration.....87
Menu 4: IDE Configuration.....88
Menu 5: IDE Master and IDE Slave Configuration.....90
Menu 6: Super IO Configuration.....95
Menu 7: Hardware Health Configuration.....98
Menu 8: AHCI Configuration.....99
Menu 9:Advanced Power Management Configuration.....100
Menu 10: Remote Access Configuration [Advanced].....103
Menu 11: USB Configuration.....106
Menu 12: PCI/PnP Configuration.....108
Menu 13: Boot.....110
Menu 14: Boot Settings Configuration.....111
Menu 15: Security.....113
Menu 16: Chipset.....115
Menu 17:NorthBridge Chipset Configuration.....116
Menu 18:SouthBridge Chipset Configuration.....118
Menu 19:Exit.....120

Glossary

AC ’97	Audio Codec 97
ACPI	Advanced Configuration and Power Interface
APM	Advanced Power Management
ARMD	ATAPI Removable Media Device
ASKIR	Shift Keyed Infrared
ATA	Advanced Technology Attachments
BIOS	Basic Input/Output System
CFII	Compact Flash Type 2
CMOS	Complementary Metal Oxide Semiconductor
CPU	Central Processing Unit
Codec	Compressor/Decompressor
COM	Serial Port
DAC	Digital to Analog Converter
DDR	Double Data Rate
DIMM	Dual Inline Memory Module
DIO	Digital Input/Output
DMA	Direct Memory Access
EIDE	Enhanced IDE
EIST	Enhanced Intel SpeedStep Technology
FDD	Floppy Disk Drive
FDC	Floppy Disk Connector
FFIO	Flexible File Input/Output
FIFO	First In/First Out
FSB	Front Side Bus
IrDA	Infrared Data Association
HDD	Hard Disk Drive
IDE	Integrated Data Electronics
I/O	Input/Output
ICH4	I/O Controller Hub 4
L1 Cache	Level 1 Cache
L2 Cache	Level 2 Cache
LCD	Liquid Crystal Display
LPT	Parallel Port Connector
LVDS	Low Voltage Differential Signaling
MAC	Media Access Controller
OS	Operating System
PCI	Peripheral Connect Interface
PIO	Programmed Input Output
PnP	Plug and Play
POST	Power On Self Test
RAM	Random Access Memory
SATA	Serial ATA
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology
SPD	Serial Presence Detect
S/PDI	Sony/Philips Digital Interface
SDRAM	Synchronous Dynamic Random Access Memory
SIR	Serial Infrared
UART	Universal Asynchronous Receiver-transmitter
USB	Universal Serial Bus
VGA	Video Graphics Adapter

Chapter

1

Introduction

1.1 KINO-9654G4 Overview

The KINO-9654G4 motherboard is an Intel® Core™2 Extreme/Core™2 Quad/Core™2 Duo/Pentium® D/Celeron® D CPU platform with an Intel® Q965 Chipset and Intel® I/O Controller Hub 8 (ICH8). The KINO-9654G4 has a maximum front side bus (FSB) frequency of 1066MHz, supports up to 4GB of dual channel 800MHz DDR2 DIMM RAM and comes with VGA, USB 2.0, PS/2 keyboard/mouse and COM port interfaces as well as four Broadcom BCM5787M PCIe GbE chipsets. The KINO-9654G4 supports up to six USB 2.0 devices, two IDE hard disk drives, Infrared Data Association (IrDA) communications and expansion is via a PCIe x16 interface.

1.1.1 KINO-9654G4 Applications

The KINO-9654G4 is designed for applications in the following areas:

- Industrial and hard environment PC applications
- Human Machine Interface (HMI) applications
- Communication and network monitoring applications
- Marine, GPS and transportation applications
- Financial, retail and kiosk applications
- Medical applications

1.1.2 KINO-9654G4 Benefits

Some of the KINO-9654G4 benefits include:

- Dual-core Intel® processor support
- DDR2 memory technology support
  - Dual-channel DDR2 memory technology at 800MHz
  - Up to 10.7GB/s of peak memory bandwidth
- SATA II with 3.0Gb/s transfer rate
- Four PCIe GbE enhance high performance in network
- Multiple storage option integration including
  - 40 Pin IFM or 3.5” HDD
  - Two SATA II ports support

- Supports PCI Express x16 high-performance graphic card

1.1.3 KINO-9654G4 Features

Some of the KINO-9654G4 features are listed below:

- Complies with RoHS
- Supports Intel® Core™2 Extreme / Core™2 Quad / Core™2 Duo / Pentium® D / Celeron® D CPUs
- Supports a maximum front side bus (FSB) speed up to 1066MHz
- Supports up to 4GB of 533MHz, 667MHz or 800MHz of DDR2 memory
- Comes with four high performance gigabit Ethernet (GbE) controllers
- Supports two SATA channels with transfer rates up to 3.0Gb/s
- Supports six USB 2.0 devices

1.2 KINO-9654G4 Board Overview

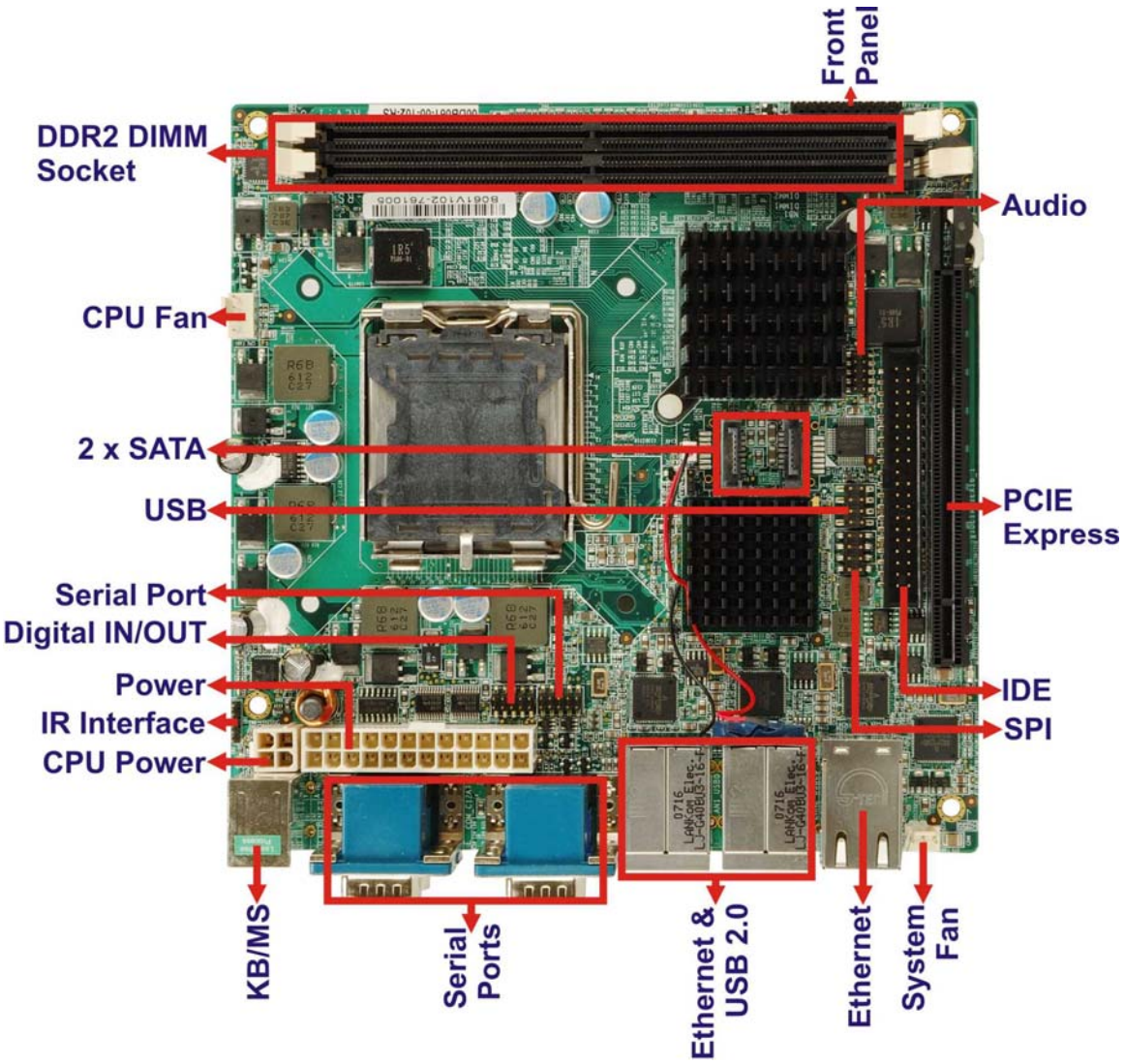


Figure 1-1: KINO-9654G4 Board Overview

1.2.1 KINO-9654G4 Connectors

The KINO-9654G4 has the following connectors on-board:

- 1 x Audio connector
- 1 x CPU 12V power connector
- 2 x DDR2 DIMM sockets
- 2 x Fan connectors
- 1 x Front panel connector
- 1 x Digital Input/Output connector
- 1 x IDE Interface connector
- 1 x IR interface connector
- 1 x PCI Express x16 slot
- 1 x Power connector
- 1 x Serial port connector
- 2 x SATA II connectors
- 2 x USB connectors

The KINO-9654G4 has the following connectors on the board rear panel:

- 1 x CRT connector
- 4 x Ethernet connectors
- 2 x Keyboard/Mouse connectors
- 3 x Serial port connectors
- 4 x USB 2.0 ports

The KINO-9654G4 has the following on-board jumper:

- Clear CMOS

The location of these connectors on the motherboard can be seen in **Figure 1-1**. These connectors are fully described in **Chapter 3**.

1.2.2 Technical Specifications

KINO-9654G4 technical specifications are listed in **Table 1-1**. Detailed descriptions of each specification can be found in **Chapter 2 Detailed Specifications**.

SPECIFICATION	
CPUs Supported	Intel® Core™2 Extreme / Core™2 Quad / Core™2 Duo / Pentium® D / Celeron® D FSB 533/800/1066MHz
Chipset	Intel® Q965 Express Chipset: -Intel® 82Q965 Graphics and Memory Controller Hub GMCH) -Intel® ICH8 I/O Controller Hub (ICH)
I/O Controller	ICH8
Graphics Support	Intel® Graphics Media Accelerator 3000
Display	CRT
Memory	Dual channel DDR2 533/667/800MHz memory modules (Max. 4GB)
PCI Bus Interface	33MHz, Revision 2.3
Serial ATA (SATA)	Two SATA II connectors with 3.0Gb/s transfer rates
HDD Interface	One IDE channel support two Ultra ATA 100 devices
USB Interfaces	Six USB 2.0 connectors supported
Serial Ports	Four COM ports
Extension	One PCIe x16 graphic port
Super I/O	iTE IT8712F
IrDA	One IrDA connector
Digital I/O	4 input / 4 output by super I/O
Audio	7.1 channel HD audio kit with Realtek ALC883 codec

	supports dual audio streams
Ethernet	Four Broadcom BCM5787 for PCI Express GbE chipsets
BIOS	AMI BIOS Label
Power	ATX power
Physical Dimensions	170mm x 170mm (width x length)
Weight (GW/NW)	1000g/400g
Operating Temperature	Minimum: 0ºC (32°F) Maximum: 60°C (140°F)

Table 1-1: Technical Specifications

Chapter

2

Detailed Specifications

2.1 Overview

This chapter describes the specifications and on-board features of the KINO-9654G4 in detail.

2.2 Dimensions

2.2.1 Board Dimensions

The dimensions of the board are listed below:

- Length: 170mm
- Width: 170mm

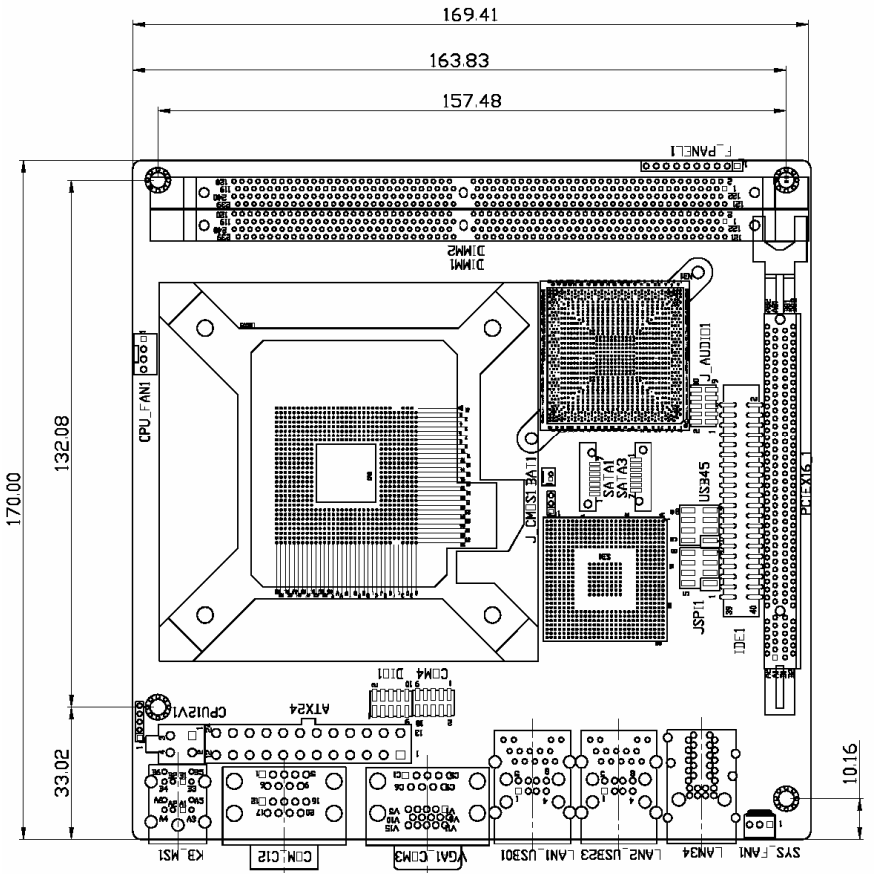


Figure 2-1: KINO-9654G4 Dimensions (mm)

2.2.2 External Interface Panel Dimensions

External interface panel dimensions are shown in **Figure 2-2**.

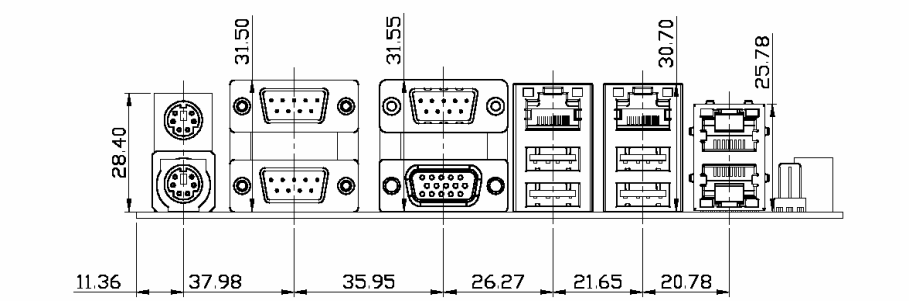


Figure 2-2: External Interface Panel Dimensions (mm)

2.3 Data Flow

Figure 2-3 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.

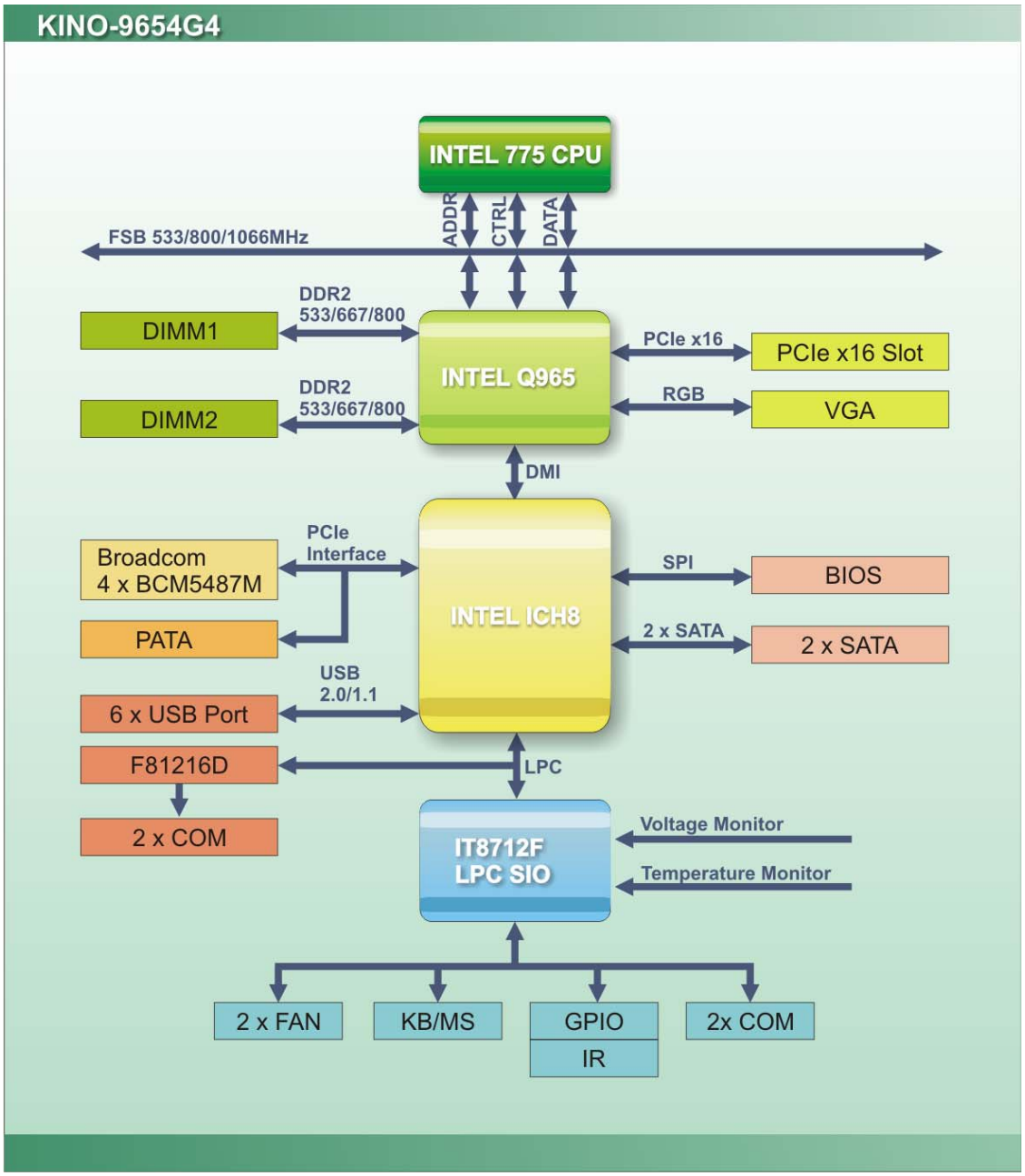


Figure 2-3: Data Flow Block Diagram

2.4 Compatible Processors

The KINO-9654G4 supports the following LGA775 processors:

- Intel® Core™2 Extreme
- Intel® Core™2 Quad
- Intel® Core™2 Duo
- Intel® Pentium® D
- Intel® Celeron® D

All of the above processors are interfaced with an Intel® Q965 northbridge chipset through the front side bus (FSB). Features of the supported processors are listed in sections below.

2.4.1 Intel® Core™2 Extreme Features

Intel® Core™2 Extreme features include:

- Four processing cores
- Up to 8MB of shared L2 cache
- Up to 1066 MHz FSB
- Enhanced Intel Speedstep® Technology
- Supports Intel® Virtualization Technology
- Supports Intel® 64
- Supports Execute Disable Bit capability

2.4.2 Intel® Core™2 Quad Features

Intel® Core™2 Quad features include:

- Four processing cores
- Up to 8MB of shared L2 cache
- Up to 1066 MHz FSB
- Intel® Wide Dynamic Execution
- Intel® Intelligent Power Capability
- Intel® Smart Memory Access
- Intel® Advanced Smart Cache

- Intel® Advanced Digital Media Boost

2.4.3 Intel® Core™2 Duo Features

Intel® Core™2 Duo features include:

- Two processing cores
- Up to 8MB of shared L2 cache
- Up to 1066 MHz FSB
- Intel® Wide Dynamic Execution
- Intel® Intelligent Power Capability Intel® Smart Memory Access
- Intel® Advanced Smart Cache
- Intel® Advanced Digital Media Boost

2.4.4 Intel® Pentium® D Features

Intel® Pentium® D features include:

- Dual core processing improves performance and multimedia management
- Intel® Visualization Technology
- Dual 2MB level 2 cache
- 800MHz FSB
- Execute Disable Bit
- Intel® Extended Memory 64 Technology
- Enhanced Intel SpeedStep® Technology
- Streaming SIMD solutions

2.4.5 Intel® Celeron® D Features

Intel® Celeron® D features include:

- Intel® Extended Memory 64 Technology
- 512KB Level 2 cache
- 533MHz FSB
- Execute Disable Bit
- Streaming SIMD solutions

2.5 Intel® Q965 Northbridge Chipset

2.5.1 Intel® Q965 Overview

The Intel® Q965 (G)MCH supports LGA775 processors. The (G)MCH supports a FSB frequency of 533 MHz, 800 MHz or 1066 MHz. Some of the features of the Intel® Q965 (G)MCH Include:

- Support for the following processors.
  - Intel® Core™2 Extreme
  - Intel® Core™2 Quad
  - Intel® Core™2 Duo
  - Intel® Pentium® D
  - Intel® Celeron® D
- Supports Hyper-Threading Technology (HT Technology)
- Supports FSB Dynamic Bus Inversion (DBI)
- Supports 36-bit host bus addressing, allowing the processor to access the entire
- 64 GB of the (G)MCH's memory address space
- Has a 12-deep In-Order Queue to support up to twelve outstanding pipelined address requests on the host bus
- Has a 1-deep Defer Queue
- Uses GTL+ bus driver with integrated GTL termination resistors
- Supports a Cache Line Size of 64 bytes

2.5.2 Intel® Q965 Memory Support

WARNING:

Only DDR2 memory module can be installed on the KINO-9654G4. Do not install DDR memory modules. If a DDR memory module is installed on the KINO-9654G4, the KINO-9654G4 may be irreparably damaged.

The Intel® Q965 supports up to two 2GB DDR2 DIMMs with the following specifications:

- Only un-buffered DIMMs supported
- DDR2 only
- Maximum supported bandwidth (assuming DDR2 800 MHz):
  - ***Single-channel***: 6.4 GB/s
  - ***Dual-channel asymmetric mode***: 6.4 GB/s
  - ***Dual-channel interleaved mode***: 12.8 GB/s
- Capacities of 256MB, 512MB, 1GB or 2GB
- Transfer speeds of 533MHz, 667MHz or 800MHz

The memory sockets are shown in **Figure 2-4**.

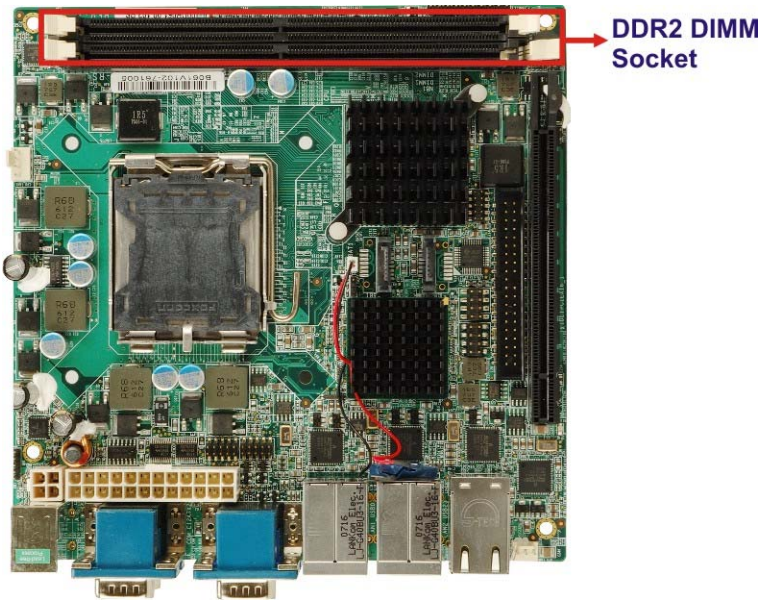


Figure 2-4: 240-pin DIMM Socket

2.5.2.1 Intel® Q965 Analog CRT Support

A DB-15 VGA connector on the external peripheral interface connector panel is interfaced to the Intel® Q965 graphics engine. The Intel® Q965 internal graphics engine, with an 400MHz integrated 24-bit RAMDAC. Some of the graphics features are listed below.

- Analog Display Support
- 400 MHz Integrated 24-bit RAMDAC

- Up to 2048x1536 @ 75 Hz refresh
- Hardware Color Cursor Support
- DDC2B Compliant Interface

2.5.3 Intel® Q965 PCIe x16

2.5.3.1 PCIe x16 Bus Overview

The Intel® Q965 northbridge has on 16-lane PCIe port that is intended for an external PCIe graphics card. The PCIe x16 graphics card is installed on a PCIe x16 socket on the KINO-9654G4 shown in **Figure 2-5**.

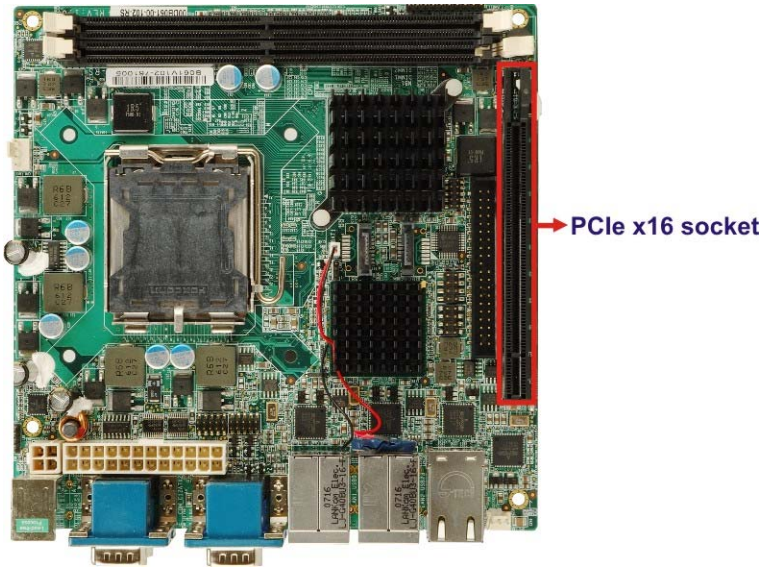


Figure 2-5: PCIe x16 Socket

2.5.3.2 PCIe x16 Bus Specifications

The PCIe port is compliant with the PCI Express Base Specification revision 1.1. The PCIe x16 port operates at a frequency of 2.5 Gb/s on each lane while employing 8b/10b encoding; the port supports a maximum theoretical bandwidth of 40 Gb/s in each direction. Some of the features are listed below.

- One, 16-lane PCIe port intended for graphics attach, compatible to the PCI Express Base Specification revision 1.1a.
- PCI Express frequency of 1.25 GHz resulting in 2.5 Gb/s each direction

- Raw bit-rate on the data pins of 2.5 Gb/s results in a real bandwidth per pair of 250 MB/s given the 8b/10b encoding used to transmit data across this interface
- Maximum theoretical realized bandwidth on the interface of 4 GB/s in each direction simultaneously, for an aggregate of 8 GB/s when x16.
- PCI Express Graphics Extended Configuration Space. The first 256 bytes of configuration space alias directly to the PCI Compatibility configuration space. The remaining portion of the fixed 4-KB block of memory-mapped space above that (starting at 100h) is known as extended configuration space.
- PCI Express Enhanced Addressing Mechanism. Accessing the device configuration pace in a flat memory mapped fashion.
- Automatic discovery, negotiation, and training of link out of reset
- Supports traditional PCI style traffic (asynchronous snooped, PCI ordering)
- Supports traditional AGP style traffic (asynchronous non-snooped, PCI Express relaxed ordering)
- Hierarchical PCI-compliant configuration mechanism for downstream devices (i.e., normal PCI 2.3 Configuration space as a PCI-to-PCI bridge)

2.5.4 Intel® Q965 Direct Media Interface (DMI)

Intel® Q965 northbridge GMCH is connected to the Intel® ICH8 Southbridge Chipset through the chip-to-chip Direct Media Interface (DMI). Features of the Intel® Q965 DMI are listed below:

- chip-to-chip connection interface to Intel ICH8
- 2GB/s (1GB/s in each direction) bus speed
- 32-bit downstream address
- 100 MHz reference clock (shared with PCI Express Graphics Attach)
- APIC and MSI interrupt messaging support
- Message Signaled Interrupt (MSI) messages
- SMI, SCI and SERR error indication
- DMA, floppy drive, and LPC bus master

2.6 Intel® ICH8 Southbridge Chipset

2.6.1 Intel® ICH8 Overview

The Intel® ICH8 southbridge chipset is connected to the Intel® Q965 northbridge GMCH through the chip-to-chip Direct Media Interface (DMI). Some of the features of the Intel® ICH8 are listed below.

- Complies with PCI Express Base Specification, Revision 1.1
- Complies with PCI Local Bus Specification, Revision 2.3 and supports 33MHz PCI operations
- Supports ACPI Power Management Logic
- Contains:
  - Enhanced DMA controller
  - Interrupt controller
  - Timer functions
- Integrated SATA host controller with DMA operation
- Supports the USB 2.0 devices on the KINO-9654G4
- Integrated 10/100/1000 GbE MAC with System Defense
- Complies with System Management Bus (SMBus) Specification, Version 2.0
- Supports Intel High Definition Audio
- Low Pin Count (LPC) interface
- Firmware Hub (FWH) interface support
- Serial Peripheral Interface (SPI) support

2.6.2 Intel® High Definition Audio

The KINO-9654G4 onboard audio connector can connect to an optional audio kit. The codec on the optional audio kit is connected to the ICH8 controller through the Intel® High Definition Audio serial link. The DMA engines in the controller move samples of digitally encoded data between system memory and the audio kit codec.

2.6.3 Intel® ICH8 PCIe Ports

The KINO-9654G4 Intel® ICH8 southbridge PCIe bus is connected to four Broadcom BCM5787M PCIe Gigabit Ethernet (GbE) controllers.

2.6.4 Intel® ICH8 Low Pin Count (LPC) Interface

The ICH8 LPC interface complies with the LPC 1.1 specifications. The LPC bus from the ICH8 is connected to the following components:

- BIOS chipset
- Super I/O chipset

2.6.5 Intel® ICH8 Real Time Clock

256 bytes of battery backed RAM is provided by the Motorola MC146818A real time clock (RTC) integrated into the ICH8. The RTC operates on a 3V battery and 32.768KHz crystal. The RTC keeps track of the time and stores system data even when the system is turned off.

2.6.6 Intel® ICH8 SATA Controller

The integrated SATA controllers on the ICH8 southbridge support two SATA II drives on the KINO-9654G4. SATA controller specifications are listed below.

- Supports two SATA drives
- Supports 3Gb/s data transfer speeds
- Supports Serial ATA 1.0 Specification, Revision 1.0

2.6.7 Intel® ICH8 USB Controller

Up to six high-speed, full-speed or low-speed USB devices are supported by the ICH8 on the KINO-9654G4. High-speed USB 2.0, with data transfers of up to 480MB/s, is enabled with the ICH8 integrated Enhanced Host Controller Interface (EHCI) compliant host controller. USB full-speed and low-speed signaling is supported by the ICH8 integrated Universal Host Controller Interface (UHCI) controllers.

2.7 Intel® ICH8 PCIe Bus Components

2.7.1 PCIe Gigabit Ethernet (GbE) Controller

The KINO-9654G4 Intel® ICH8 southbridge PCIe bus is connected to four Broadcom BCM5787M PCIe Gigabit Ethernet (GbE) controllers. The Broadcom BCM5787M controllers are then connected to four RJ-45 Ethernet connector enabling the KINO-9654G4 to be connected to an external network.

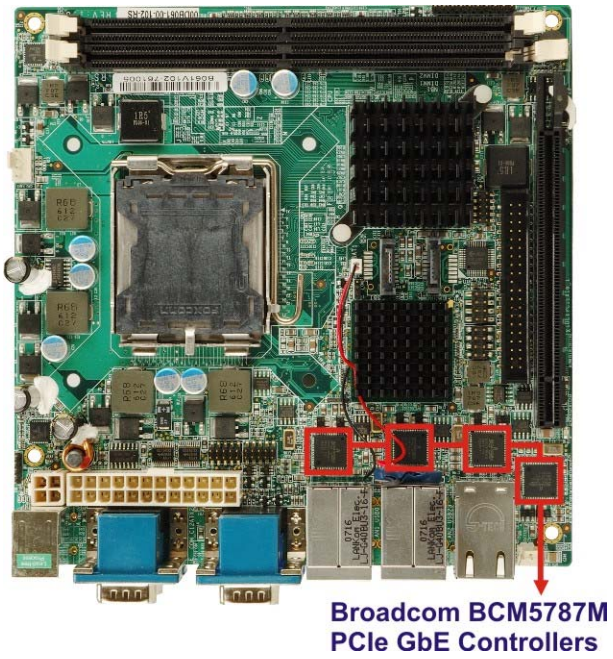


Figure 2-6: Ethernet Controllers

The Broadcom BCM5787M is a 10/100/1000BASE-T Ethernet LAN controller. The BCM5787M combines a triple-speed IEEE 802.3 compliant Media Access Controller

(MAC) with a triple-speed Ethernet transceiver, a PCIe bus interface, and an on-chip buffer memory. Some of the BCM5787 controller features are listed below:

- Integrated 10/100/1000BASE-T transceiver
- Automatic MDI crossover function
- PCIe v1.0a
- 10/100/1000BASE-T full/half-duplex MAC
- Wake on LAN support meeting the ACPI requirements
- Statistics for SNMP MIB II, Ethernet-like MIB, and Ethernet MIB (802.3z, clause 30)
- Serial EEPROM or serial flash support

2.8 LPC Bus Components

2.8.1 LPC Bus Overview

The LPC bus is connected to components listed below:

- BIOS chipset
- Super I/O chipset

2.8.2 BIOS Chipset

The BIOS chipset has a licensed copy of AMI BIOS installed on the chipset. Some of the BIOS features are listed below:

- AMI Flash BIOS
- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (Pre-boot Execution Environment) support
- USB booting support

2.8.3 Super I/O chipset

The iTE IT8712F Super I/O chipset is connected to the ICH8 southbridge through the LPC bus. The iTE IT8712F is an LPC interface-based Super I/O device that comes with

Environment Controller integration. Some of the features of the iTE IT8712F chipset are listed below:

- PC98/99/2001, ACPI and LANDesk Compliant
- Enhanced Hardware Monitor
- Fan Speed Controller
- Single +5V Power Supply
- Two 16C550 UARTs for serial port control
- Keyboard Controller
- Watchdog Timer
- Serial IRQ Support
- Vbat & Vcch Support
- Single +5V Power Supply

Some of the Super I/O features are described in more detail below:

2.8.3.1 Super I/O LPC Interface

The LPC interface on the Super I/O complies with the Intel® Low Pin Count Specification Rev. 1.0. The LPC interface supports both LDRQ# and SERIRQ protocols as well as PCI PME# interfaces.

2.8.3.2 Super I/O 16C550 UARTs

The onboard Super I/O has two integrated 16C550 UARTs that can support the following:

- Two standard serial ports (COM1 and COM2)
- IrDa 1.0 and ASKIR protocols

Another two chipsets connected to the LPC bus provided connectivity to another two serial port connectors (COM3 and COM4).

2.8.3.3 Super I/O Enhanced Hardware Monitor

The Super I/O Enhanced Hardware Monitor monitors three thermal inputs, VBAT internally, and eight voltage monitor inputs. These hardware parameters are reported in the BIOS and can be read from the BIOS Hardware Health Configuration menu.

2.8.3.4 Super I/O Fan Speed Controller

The Super I/O fan speed controller enables the system to monitor the speed of the fan. One of the pins on the fan connector is reserved for fan speed detection and interfaced to the fan speed controller on the Super I/O. The fan speed is then reported in the BIOS.

2.8.3.5 Super I/O Keyboard Controller

The Super I/O keyboard controller can execute the 8042 instruction set. Some of the keyboard controller features are listed below:

- The 8042 instruction is compatible with a PS/2 keyboard and PS/2 mouse
- Gate A20 and Keyboard reset output
- Supports multiple keyboard power on events
- Supports mouse double-click and/or mouse move power on events

2.9 Environmental and Power Specifications

2.9.1 System Monitoring

Three thermal inputs on the KINO-9654G4 Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- System temperature
- Power temperature
- CPU temperature

Eight voltage inputs on the KINO-9654G4 Super I/O Enhanced Hardware Monitor monitor the following voltages:

- CPU Core
- DDR2 1.8V
- +3.30V
- +5.00V
- +12.0V
- FSB 1.2V
- +1.5V

- +1.25V
- VBAT

The KINO-9654G4 Super I/O Enhanced Hardware Monitor also monitors the following voltages internally:

- VBAT

The KINO-9654G4 Super I/O Enhanced Hardware Monitor also monitors the following fan speeds:

- CPU Fan speed

The values for the above environmental parameters are all recorded in the BIOS Hardware Health Configuration menu.

2.9.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the KINO-9654G4 are listed below.

- Minimum Operating Temperature: 0ºC (32°F)
- Maximum Operating Temperature: 60°C (140°F)

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the northbridge and southbridge chipsets to ensure the operating temperature of these chips remain low.

2.9.3 Power Consumption

Table 2-1 shows the power consumption parameters for the KINO-9654G4 running with a 2.66GHz 1066MHz FSB Intel® Core® 2 Extreme QX6700 processor with 1GB of 800MHz DDR2 memory.

Voltage	Current
+3.3V	5.15A
+5V	6.62A
+12V	7.56A

Table 2-1: Power Consumption

Chapter

3

Unpacking

3.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the KINO-9654G4 may result in permanent damage to the KINO-9654G4 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the KINO-9654G4. Dry climates are especially susceptible to ESD. It is critical that the following anti-static precautions are strictly adhered to whenever handling the KINO-9654G4 or any other electrical component.

- ***Wear an anti-static wristband*** - Wearing a simple anti-static wristband can help to prevent ESD from damaging the KINO-9654G4.
- ***Self-grounding*** - Touch a grounded conducting material before handling and periodically while handling the KINO-9654G4.
- ***Use an anti-static pad*** - When configuring the KINO-9654G4, place it on an antic-static pad to reduce the possibility of ESD damage.
- ***Only handle the edges of the KINO-9654G4*** - When handling the KINO-9654G4, hold it by its edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the KINO-9654G4 is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 3.1**.
- Make sure the packing box is facing upwards so the KINO-9654G4 does not fall out of the box.
- Make sure all the components shown in **Section 3.3** are present.

3.3 Unpacking Checklist

NOTE:

If any components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the KINO-9654G4 was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

3.3.1 Package Contents

The KINO-9654G4 is shipped with the following components:

Quantity	Item and Part Number	Image
1	KINO-9654G4 motherboard	
1	IDE flat cable (P/N: 32200-008800-RS)	
2	SATA cable (P/N: 32000-062800-RS)	
1	SATA power cable (P/N: 32100-088600-RS)	
1	RS-232 adapter cable (P/N: 32200-000049-RS)	

Quantity	Item and Part Number	Image
1	I/O shielding	
1	Mini jumper pack	
1	Quick Installation Guide	
1	Utility CD	

Table 3-1: Package List Contents

3.3.2 Optional Components

The following optional components are available from IEI.

Item and Part Number	Image
CPU cooling kit (P/N: CF-520-RS)	
CPU cooling kit (P/N: CF-775A-RS)	
Dual USB cable (P/N: CB-USB02-RS)	
7.1 channel HD audio kit with Realtek ACL883 (P/N: AC-KIT-883HD-R10)	
PCIe x16 VGA output SDVO card (P/N: SDVO-100VGA-R10)	
PCIe x16 DVI output SDVO card (P/N: SDVO-100DVI-R10)	

Table 3-2: Optional Components

Chapter

4

Connectors and Jumpers

4.1 Peripheral Interface Connectors

Section 4.1.1 shows peripheral interface connector locations. **Section 4.1.2** lists all the peripheral interface connectors seen in **Section 4.1.1**.

4.1.1 KINO-9654G4 Layout

Figure 4-1 shows the on-board peripheral connectors, backplane peripheral connectors and on-board jumpers.

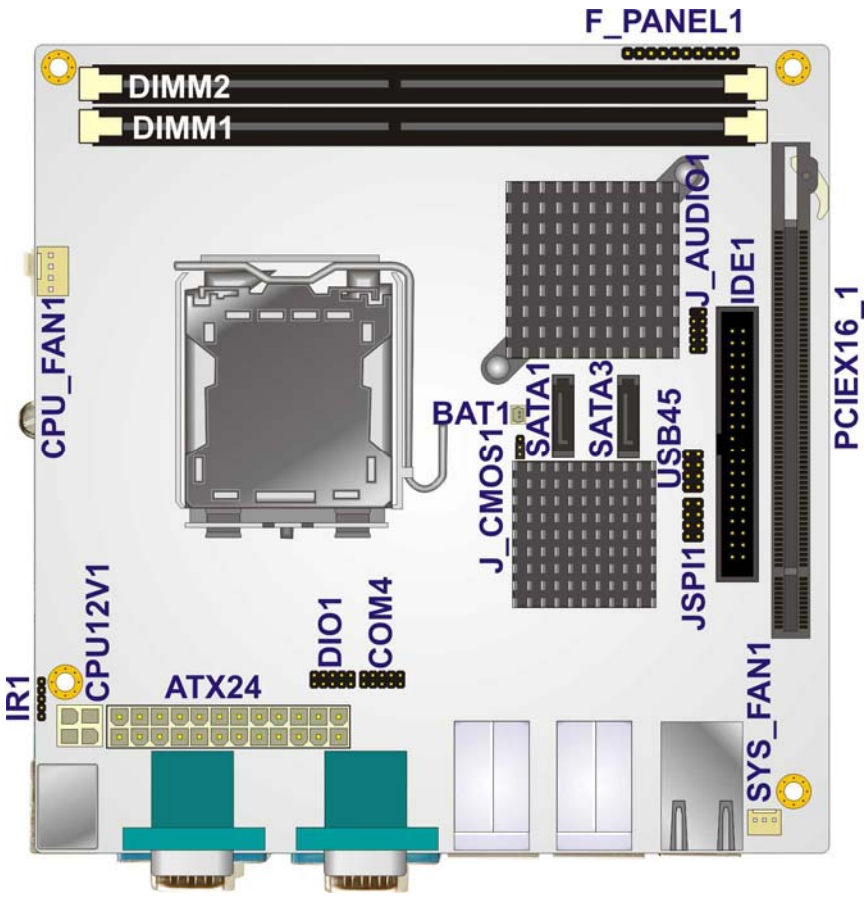


Figure 4-1: Connector and Jumper Locations

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the KINO-9654G4. Detailed descriptions of these connectors can be found in **Section 4.2**.

Connector	Type	Label
Audio connector	10-pin header	J_AUDIO1
CPU power connector	4-pin connector	CPU12V1
DDR2 DIMM socket	240-pin slot	DIMM1
DDR2 DIMM socket	240-pin slot	DIMM2
Fan connector (CPU)	4-pin wafer connector	CPU_FAN1
Fan connector (System)	3-pin wafer connector	SYS_FAN1
Front panel connector	10-pin header	F_PANEL1
Digital Input/Output connector	10-pin header	DIO1
IDE Interface connector	40-pin box header	PIDE1
IR Interface connector	5-pin header	IR1
PCI Express x16 socket	PCI Express x16 slot	PCIEX16_1
Power connector	24-pin connector	ATX24
Serial port connector	10-pin header	COM4
SPI connector	8-pin header	JSPI1
SATA drive connector (1)	7-pin SATA connector	SATA1
SATA drive connector (2)	7-pin SATA connector	SATA3
USB connector	8-pin header	USB45

Table 4-1: Peripheral Interface Connectors

4.1.3 Rear Panel Connectors

Table 4-2 lists the rear panel connectors on the KINO-9654G4. Detailed descriptions of these connectors can be found in **Section 4.3**.

Connector	Type	Label
Ethernet connector (1)	RJ-45 connector	LAN1_USB01A
Ethernet connector (2)	RJ-45 connector	LAN2_USB23A
Ethernet connectors (dual)	RJ-45 connector	LAN34
Keyboard/Mouse connector	6-pin mini din connector	KB_MS1
Serial port connector (dual)	DB-9 male connector	COM_C12
Serial port connector	DB-9 male connector	VGA1_COM3A
VGA connector	15-pin female connector	VGA1_COM3B
USB 2.0 ports (dual)	USB port connector	LAN1_USB01B
USB 2.0 ports (dual)	USB port connector	LAN2_USB23B

Table 4-2: Rear Panel Connectors

4.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the KINO-9654G4.

4.2.1 Audio Connector (10-pin)

CN Label: **J_AUDIO1**

CN Type: 10-pin header

CN Location: See **Figure 4-2**

CN Pinouts: See **Table 4-3**

The 10-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.

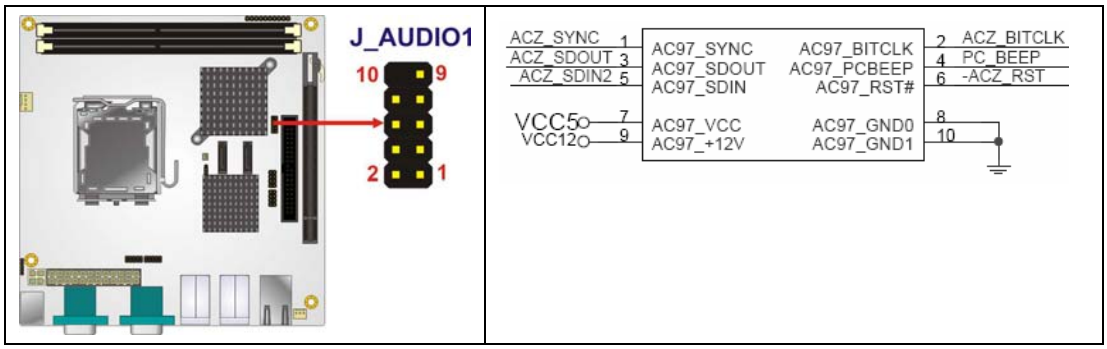


Figure 4-2: Audio Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDA_SYNC	2	HDA_BITCLK
3	HDA_SDOUT	4	HDA _PCBEEP
5	HDA_SDIN	6	HDA _RST#
7	+5V	8	HDA _GND
9	+12V	10	HDA _GND

Table 4-3: Audio Connector Pinouts

4.2.2 CPU 12V Power Connector

CN Label: **CPU12V1**

CN Type: 4-pin headers (1x4)

CN Location: See **Figure 4-3**

CN Pinouts: See **Table 4-4**

The connector supports the 12V power supply.

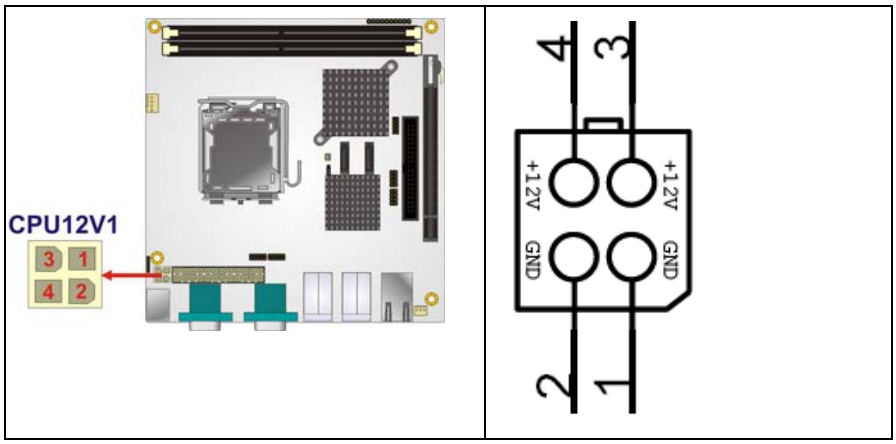


Figure 4-3: CPU 12V Power Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	+12V	4	+12V

Table 4-4: CPU 12V Power Connector Pinouts

4.2.3 Fan Connectors

CN Label: **CPU_FAN1** and **SYS_FAN1**

CN Type: 4-pin header and 3-pin header

CN Location: See **Figure 4-4**

CN Pinouts: See **Table 4-5** and **Table 4-6**

The cooling fan connectors on the KINO-9654G4 provide a 12V, 500mA current to a CPU cooling fan and a system cooling fan. All cooling fans have linear fan speed controlled by BIOS.

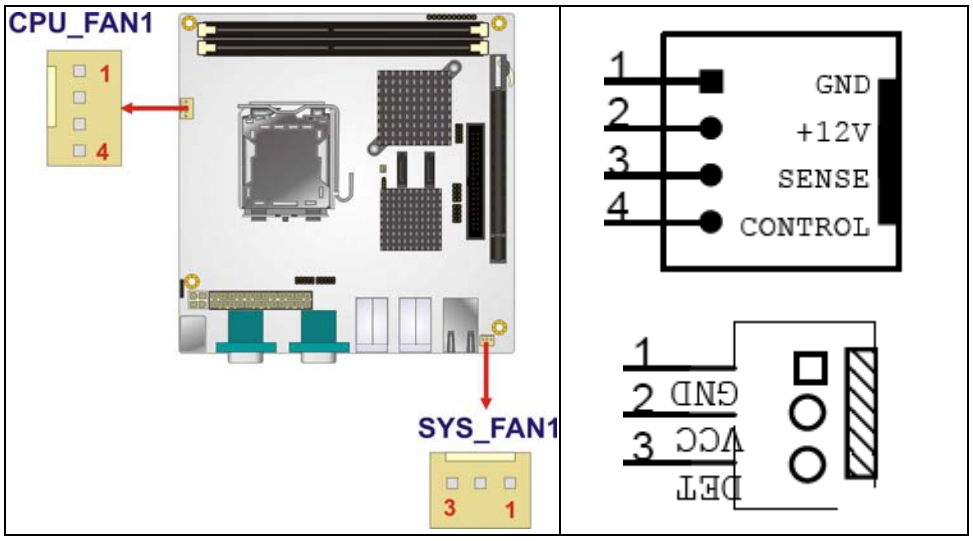


Figure 4-4: Fan Connector Locations

PIN NO.	DESCRIPTION
1	Ground
2	+12V
3	Rotation Signal
4	Control

Table 4-5: CPU Fan Connector Pinouts

PIN NO.	DESCRIPTION
1	Ground
2	+12V
3	Rotation Signal

Table 4-6: System Fan Connector Pinouts

4.2.4 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 14-pin header (2x7)

CN Location: See **Figure 4-5**

CN Pinouts: See **Table 4-7**

The front panel connector connects to several external switches and indicators to monitor and control the motherboard. These indicators and switches include:

- Power
- ATX Power button
- Reset button
- HDD

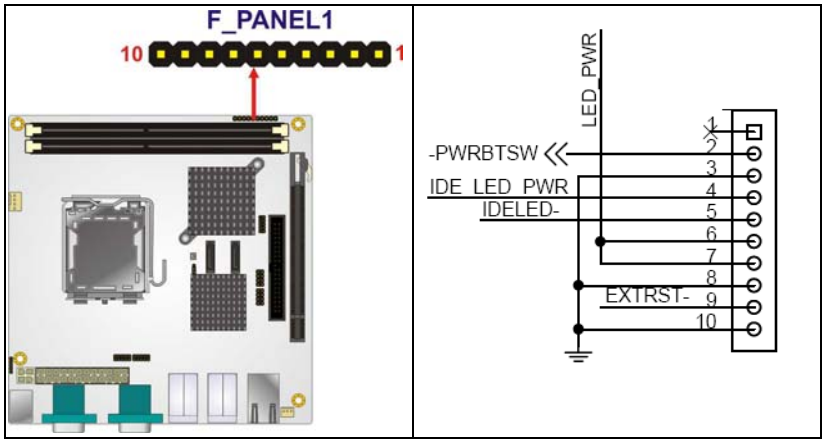


Figure 4-5: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION
	1	NC
Power Button	2	PWR_BTN+
	3	PWR_BTN-
HDD LED	4	HDD_LED+
	5	HDD_LED-
Power LED	6	PWR_LED+
	7	PWR_LED+
	8	PWR_LED-
Reset	9	RESET+
	10	RESET-

Table 4-7: Front Panel Connector Pinouts

4.2.5 Digital Input/Output Connector

CN Label: **DIO1**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 4-6**

CN Pinouts: See **Table 4-8**

The DIO connector is managed through a Super I/O chip. The DIO connector pins are user programmable. The digital IO port of KINO-9654G4 is 5V CMOS level.

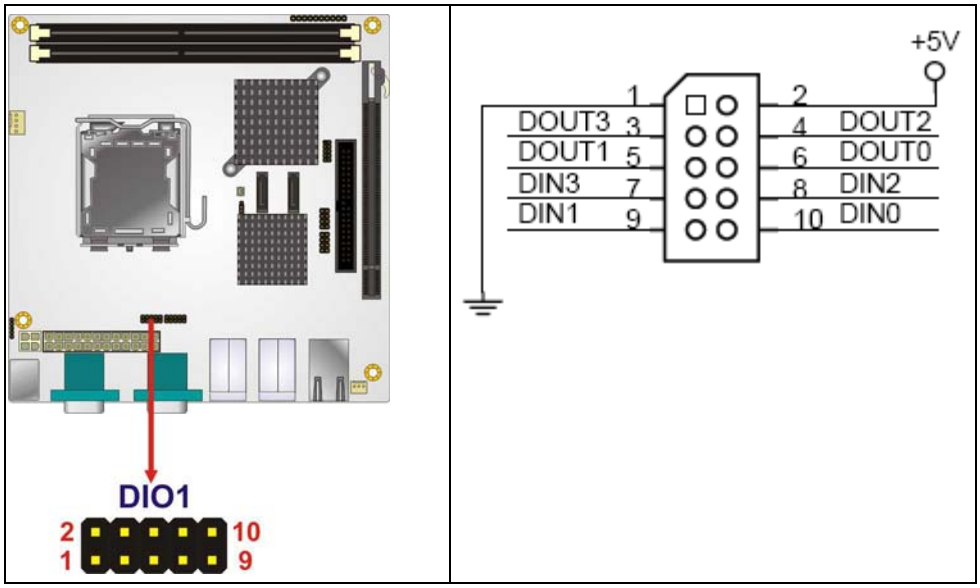


Figure 4-6: Digital I/O Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Ground	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 4-8: Digital I/O Connector Pinouts

4.2.6 IDE Connector

CN Label: **PIDE1**

CN Type: 40-pin header (2x20)

CN Location: See **Figure 4-7**

CN Pinouts: See **Table 4-9**

One primary 40-pin IDE device connector on the KINO-9654G4 motherboard supports connectivity to ATA 100 IDE devices with data transfer rates up to 100MB/s.

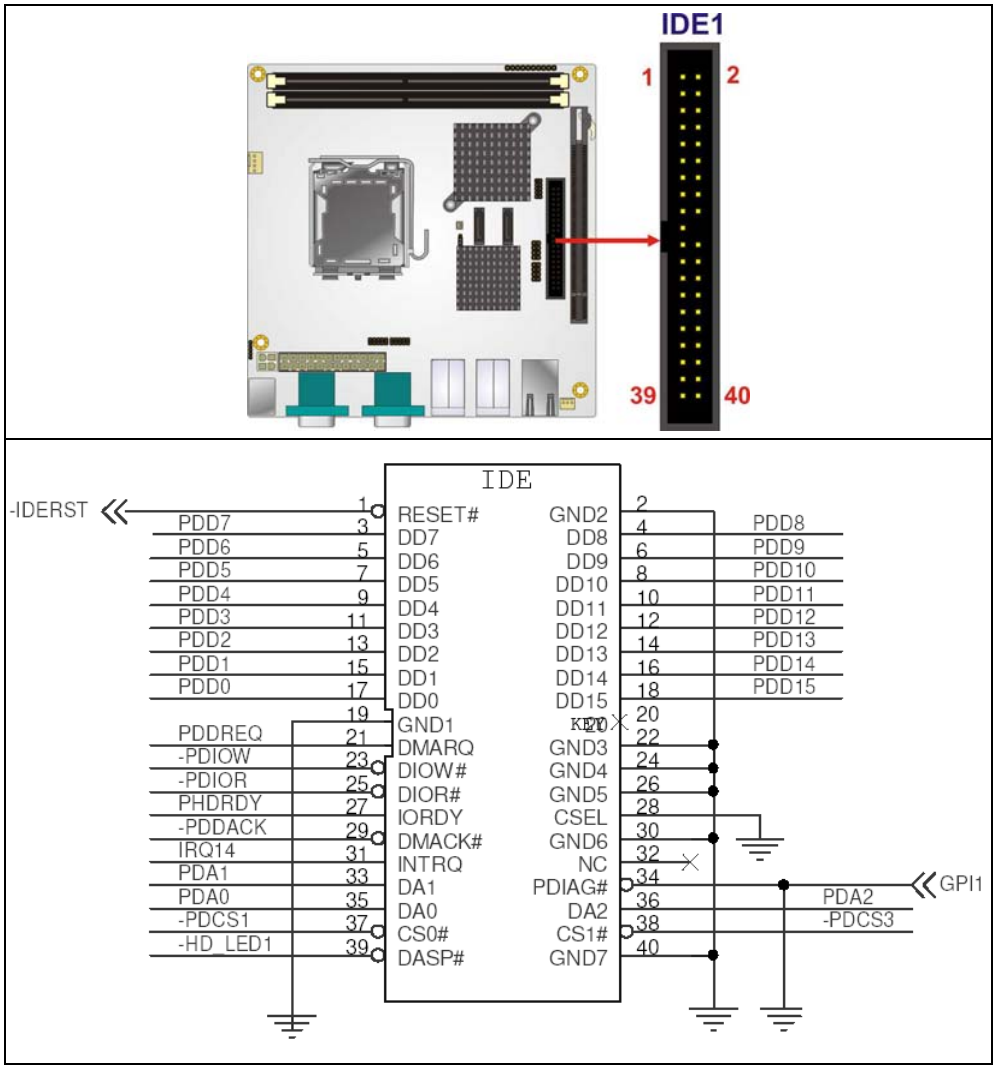


Figure 4-7: IDE Device Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	CHRDY	28	REV. PULL LOW
29	DACK	30	GROUND-DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

Table 4-9: IDE Connector Pinouts

4.2.7 IR Interface Connector

CN Label: **IR1**

CN Type: 5-pin header (1x5)

CN Location: See **Figure 4-8**

CN Pinouts: See **Table 4-10**

The integrated infrared (IrDA) connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.

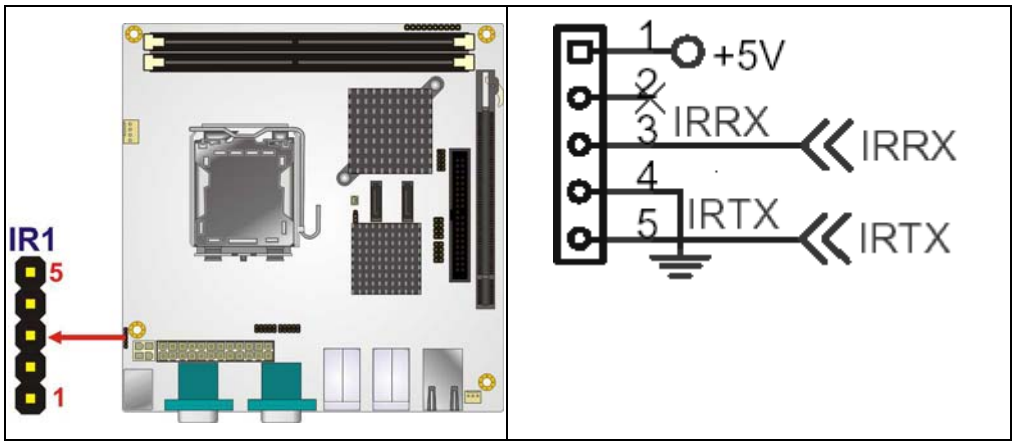


Figure 4-8: IR Connector Location

PIN NO.	DESCRIPTION
1	VCC
2	NC
3	IR-RX
4	Ground
5	IR-TX

Table 4-10: IR Connector Pinouts

4.2.8 PCI Express x16 Slot

CN Label: **PCIEX16_1**

CN Type: 164-pin PCIe x16 slot

CN Location: See **Figure 4-9**

CN Pinouts: See **Table 4-11** (Side A) **Table 4-12** (Side B)

PCIe x16 expansion devices can be inserted into the PCIe x16 slot.

Figure 4-9: PCI Express x16 Slot Location

PIN	NAME	PIN	NAME	PIN	NAME	PIN	NAME
A1	Name	A22	HSIn(1)	A43	HSIp(6)	A64	HSIp(11)
A2	PRSNT#1	A23	GND	A44	HSIn(6)	A65	HSIn(11)
A3	+12v	A24	GND	A45	GND	A66	GND
A4	+12v	A25	HSIp(2)	A46	GND	A67	GND
A5	GND	A26	HSIn(2)	A47	HSIp(7)	A68	HSIp(12)
A6	JTAG2	A27	GND	A48	HSIn(7)	A69	HSIn(12)
A7	JTAG3	A28	GND	A49	GND	A70	GND
A8	JTAG4	A29	HSIp(3)	A50	RSVD	A71	GND
A9	JTAG5	A30	HSIn(3)	A51	GND	A72	HSIp(13)
A10	+3.3v	A31	GND	A52	HSIp(8)	A73	HSIn(13)
A11	+3.3v	A32	RSVD	A53	HSIn(8)	A74	GND
A12	PWRGD	A33	RSVD	A54	GND	A75	GND
A13	GND	A34	GND	A55	GND	A76	HSIp(14)
A14	REFCLK+	A35	HSIp(4)	A56	HSIp(9)	A77	HSIn(14)
A15	REFCLK-	A36	HSIn(4)	A57	HSIn(9)	A78	GND
A16	GND	A37	GND	A58	GND	A79	GND
A17	HSIp(0)	A38	GND	A59	GND	A80	HSIp(15)

A18	HSIn(0)	A39	HSIp(5)	A60	HSIp(10)	A81	HSIn(15)
A19	GND	A40	HSIn(5)	A61	HSIn(10)	A82	GND
A20	RSVD	A41	GND	A62	GND		
A21	GND	A42	GND	A63	GND		

Table 4-11: PCIe x16 Side A Pinouts

PIN	NAME	PIN	NAME	PIN	NAME	PIN	NAME
B1	+12v	B22	GND	B43	GND	B64	GND
B2	+12v	B23	HSOp(2)	B44	GND	B65	GND
B3	RSVD	B24	HSOn(2)	B45	HSOp(7)	B66	HSOp(12)
B4	GND	B25	GND	B46	HSOn(7)	B67	HSOn(12)
B5	SMCLK	B26	GND	B47	GND	B68	GND
B6	SMDAT	B27	HSOp(3)	B48	PRSNT#2	B69	GND
B7	GND	B28	HSOn(3)	B49	GND	B70	HSOp(13)
B8	+3.3v	B29	GND	B50	HSOp(8)	B71	HSOn(13)
B9	JTAG1	B30	RSVD	B51	HSOn(8)	B72	GND
B10	3.3Vaux	B31	PRSNT#2	B52	GND	B73	GND
B11	WAKE#	B32	GND	B53	GND	B74	HSOp(14)
B12	RSVD	B33	HSOp(4)	B54	HSOp(9)	B75	HSOn(14)
B13	GND	B34	HSOn(4)	B55	HSOn(9)	B76	GND
B14	HSOp(0)	B35	GND	B56	GND	B77	GND
B15	HSOn(0)	B36	GND	B57	GND	B78	HSOp(15)
B16	GND	B37	HSOp(5)	B58	HSOp(10)	B79	HSOn(15)
B17	PRSNT#2	B38	HSOn(5)	B59	HSOn(10)	B80	GND
B18	GND	B39	GND	B60	GND	B81	PRSNT#2
B19	HSOp(1)	B40	GND	B61	GND	B82	RSVD#2
B20	HSOn(1)	B41	HSOp(6)	B62	HSOp(11)		
B21	GND	B42	HSOn(6)	B63	HSOn(11)		

Table 4-12: PCIe x16 Side B Pinouts

4.2.9 ATX Power Connector

CN Label: **ATX24**

CN Type: 24-pin connector

CN Location: See **Figure 4-10**

CN Pinouts: See **Table 4-13**

This 24-pin power connector supports the ATX power supply.

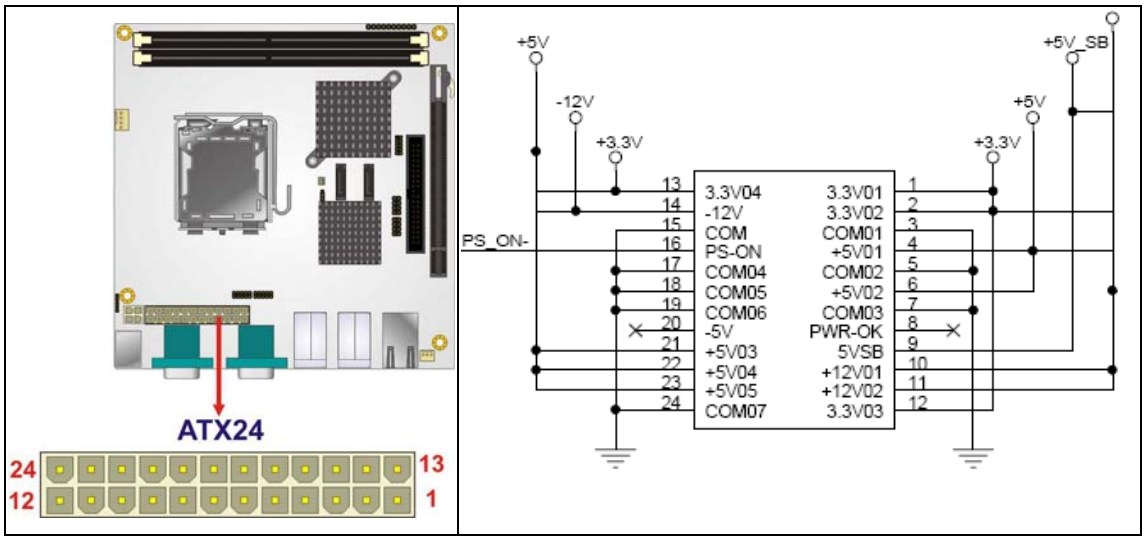


Figure 4-10: Power Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GROUND	15	GROUND
4	+5V	16	PS_ON#
5	GROUND	17	GROUND
6	+5V	18	GROUND
7	GROUND	19	GROUND
8	PWR_OK	20	-5V
9	+5VSB	21	+5V

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GROUND

Table 4-13: Power Connector Pinouts

4.2.10 Serial Port Connector

CN Label: **COM4**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 4-11**

CN Pinouts: See **Table 4-14**

The serial ports connectors connect to RS-232 serial port device.

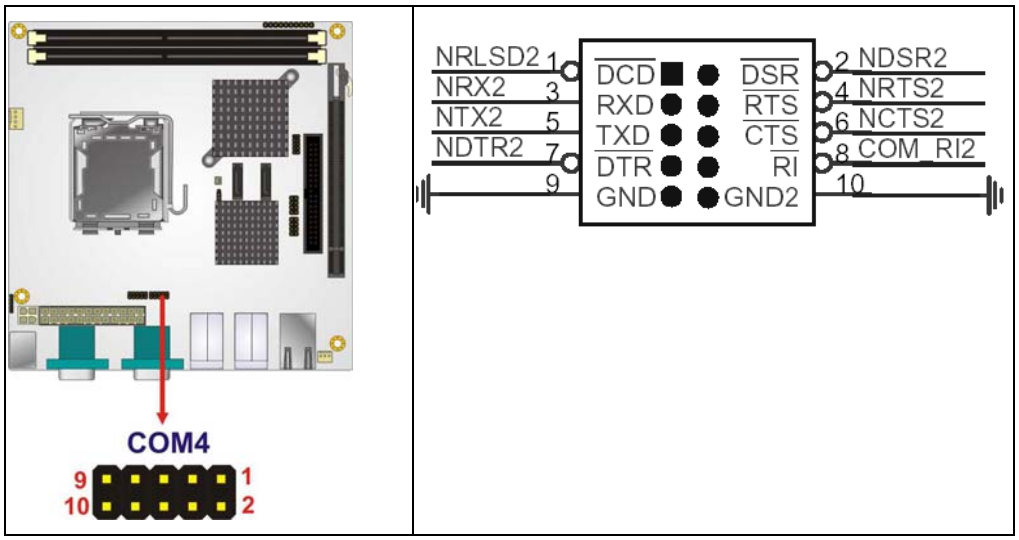


Figure 4-11: Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD1	2	DSR1
3	RXD1	4	RTS1
5	TXD1	6	CTS1

7	DTR1	8	RI1
9	GROUND	10	NC

Table 4-14: Serial Port Connector Pinouts

4.2.11 SATA Drive Connectors

CN Label: **SATA1** and **SATA3**

CN Type: 1x7 pin SATA drive connectors

CN Location: See **Figure 4-12**

CN Pinouts: See **Table 4-15**

The two SATA drive connectors are connected to two SATA II drives. SATA II drives transfer data at speeds as high as 3.0Gb/s.

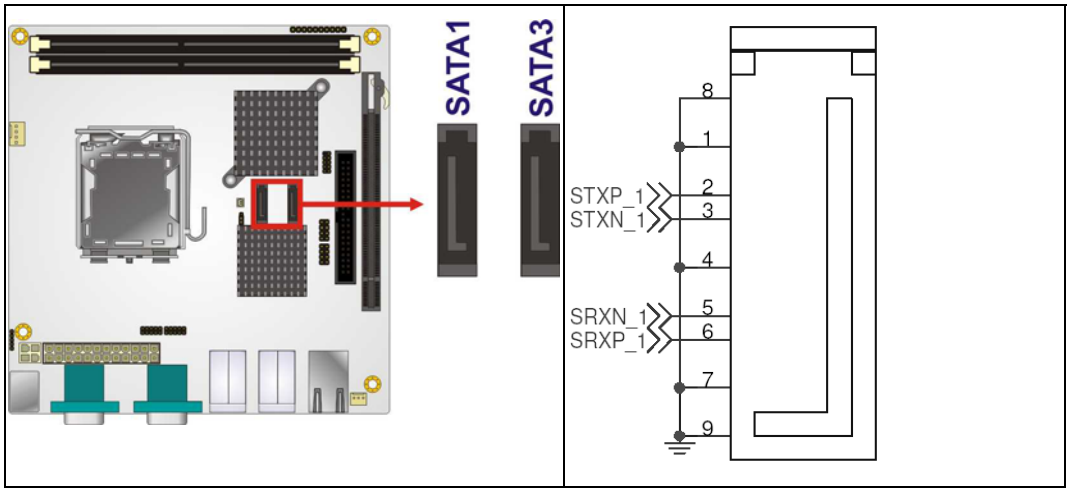


Figure 4-12: SATA Drive Connector Locations

PIN NO.	DESCRIPTION
1	GND
2	TXP
3	TXN
4	GND
5	RXN

6	RXP
7	GND

Table 4-15: SATA Drive Connector Pinouts

4.2.12 SPI Connector

CN Label: **JSPI1**

CN Type: 8-pin header (2x4)

CN Location: See **Figure 4-14**

CN Pinouts: See **Table 4-17**

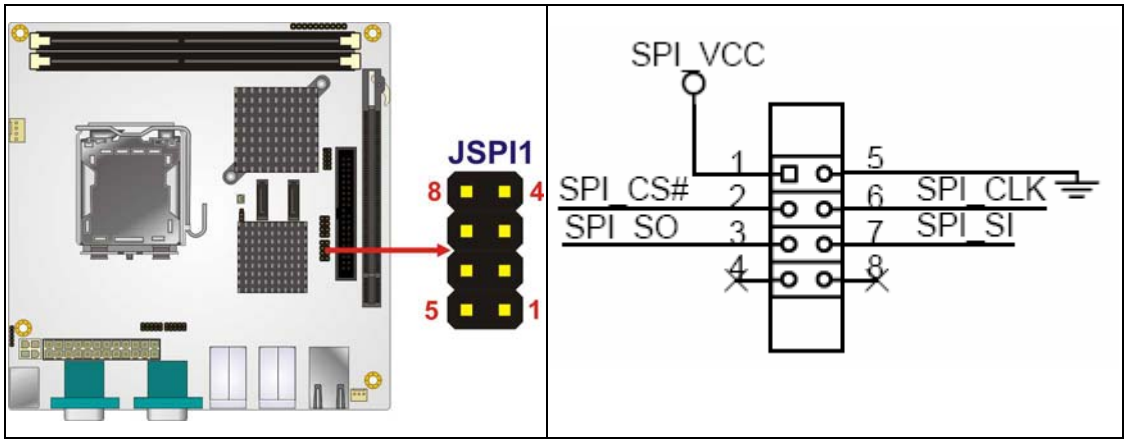


Figure 4-13: SPI Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SPI_VCC (+3.3V)	5	GND
2	SPI_CS#	6	SPI_CLK
3	SPI_SO	7	SPI_SI
4	NC	8	NC

Table 4-16: SPI Connector Pinouts

4.2.13 Internal USB Connector

CN Label: **USB45**

CN Type: 8-pin header (2x4)

CN Location: See **Figure 4-14**

CN Pinouts: See **Table 4-17**

One 2x4 pin connector provides connectivity to two USB 2.0 ports. The USB ports are used for I/O bus expansion.

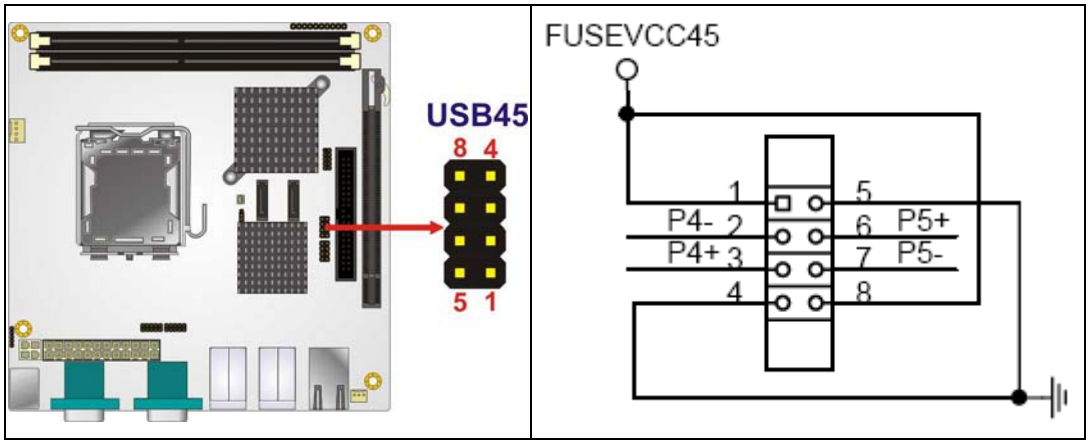


Figure 4-14: Internal USB Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USB Power	5	GND
2	DATA-	6	DATA+
3	DATA+	7	DATA-
4	GND	8	USB Power

Table 4-17: USB45 Pinouts

4.3 External Interface Connectors

The peripheral connectors on the back panel are connected to devices externally when the KINO-9654G4 is installed in a chassis. The peripheral connectors on the rear panel are:

- 1 x CRT connector
- 4 x RJ-45 Ethernet connectors
- 2 x Keyboard/mouse connectors
- 3 x Serial port connectors
- 4 x USB 2.0 connectors

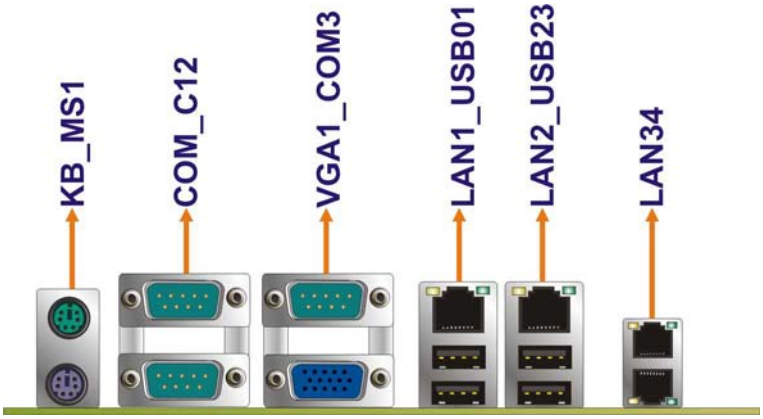


Figure 4-15: KINO-9654G4 External Interface Connectors

4.3.1 CRT Connector

CN Label: **VGA1_COM3B**

CN Type: 15-pin female connector

CN Location: See **Figure 4-15**

CN Pinouts: See **Table 4-18**

The standard 15-pin VGA connector connects to a CRT or LCD display monitor.

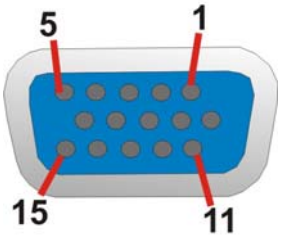


Figure 4-16: VGA Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VCC / NC	10	GND
11	NC	12	DDC DAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 4-18: VGA Connector Pinouts

4.3.2 Ethernet Connectors

CN Label: **LAN1_USB01A**, **LAN2_USB23A** and **LAN34**

CN Type: RJ-45

CN Location: See **Figure 4-15**

CN Pinouts: See **Table 4-19**

The KINO-9654G4 is equipped with four built-in GbE Ethernet controllers. The controllers can connect to the LAN through four RJ-45 LAN connectors. The pin assignments are listed in the following table:

PIN	DESCRIPTION	PIN	DESCRIPTION
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+-
3.	MDIA2-	7	MDIA0-
4.	MDIA1-	8	MDIA0+

Table 4-19: Ethernet Connector Pinouts

4.3.2.1 LAN1 and LAN2 LED Indicators

There are two LEDs on the connector indicating the status of LAN 1 and LAN 2.

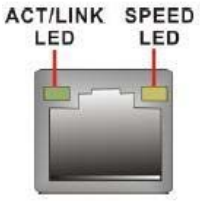


Figure 4-17: LAN 1 and LAN 2 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates the port is linked and the yellow LED indicates the speed through the port. See **Table 4-20**.

ACT/LINK LED		SPEED LED	
STATUS	DESCRIPTION	STATUS	DESCRIPTION
YELLOW	Linked	LED Off	10Mbps connection
BLINKING	Data Activity	GREEN	100Mbps connection
		ORANGE	1Gbps connection

Table 4-20: LAN 1 and LAN 2 Ethernet Connector LEDs

4.3.2.2 LAN3 and LAN4 LED Indicators

There are two LEDs on the connector indicating the status of LAN 3 and LAN 4.

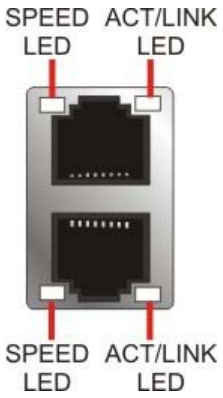


Figure 4-18: LAN 3 and LAN 4 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The LED on the left indicates speed through the port and the LED on the right indicates the port is linked. See **Table 4-21**.

SPEED LED		ACT/LINK LED	
STATUS	**DESCRIPTION**	**STATUS**	**DESCRIPTION**
GREEN	1Gbps connection	YELLOW	Linked
ORANGE	100Mbps connection	BLINKING	Data Activity
LED Off	10Mbps connection		

Table 4-21: LAN 3 and LAN 4 Ethernet Connector LEDs

4.3.3 Keyboard/Mouse Connector

CN Label: **KB_MS1**

CN Type: PS/2 connector

CN Location: See **Figure 4-15**

CN Pinouts: See **Table 4-22**

The KINO-9654G4 keyboard and mouse connectors are standard PS/2 connectors.

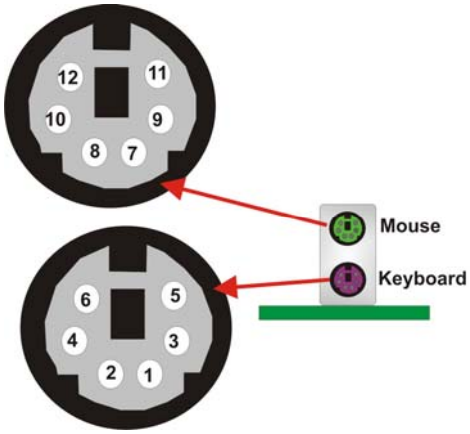


Figure 4-19: PS/2 Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	KB DATA	7	MS DATA
2	NC	8	NC
3	GROUND	9	GROUND
4	KB VCC	10	MS VCC
5	KB CLOCK	11	MS CLOCK
6	NC	12	NC

Table 4-22: PS/2 Connector Pinouts

4.3.4 Serial Port Connectors

CN Label: **COM_C12** and **VGA_COM3A**

CN Type: DB-9

CN Location: See **Figure 4-15**

CN Pinouts: See **Table 4-23**

The serial ports can be connected to a serial communications device directly.

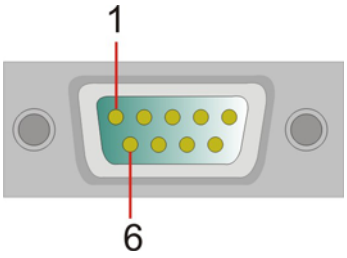


Figure 4-20: External Serial Port Connector

PIN	Description
1	DATA CARRIER DETECT (DCD)
2	RECEIVE DATA (RXD)
3	TRANSMIT DATA (TXD)
4	DATA TERMINAL READY (DTR)
5	GROUND (GND)
6	DATA SET READY (DSR)
7	REQUEST TO SEND (RTS)
8	CLEAR TO SEND (CTS)
9	RING INDICATOR (RI)

Table 4-23: External Serial Port Pinouts

4.3.5 USB Connectors

CN Label: **LAN1_USB01B** and **LAN2_USB23B**

CN Type: USB port

CN Location: See **Figure 4-15**

CN Pinouts: See **Table 4-24**

USB devices can be connected directly to the USB connectors on the rear panel.

PIN NO.	DESCRIPTION
1	VCC
2	DATA-
3	DATA+
4	GROUND

Table 4-24: External USB Connector Pinouts

Chapter

5

Installation and Configuration

5.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the KINO-9654G4 may result in permanent damage to the KINO-9654G4 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the KINO-9654G4. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the KINO-9654G4, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***: Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the KINO-9654G4, place it on an antic-static pad. This reduces the possibility of ESD damage.
- ***Only handle the edges of the PCB***: When handling the PCB, hold it by its edges.

5.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the KINO-9654G4 is installed. All installation notices pertaining to the installation of the KINO-9654G4 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the KINO-9654G4 and injury to the person installing the motherboard.

5.2.1 Installation Notices

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the KINO-9654G4 and injury to the user.

Before and during the installation please DO the following:

- **Read the user manual**:
  - The user manual provides a complete description of the KINO-9654G4 installation instructions and configuration options.
- **Wear an electrostatic discharge cuff (ESD)**:
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- **Place the KINO-9654G4 on an antistatic pad**:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- **Turn off all power to the KINO-9654G4**:

- When working with the KINO-9654G4, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the KINO-9654G4 **DO NOT**:

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

5.2.2 Installation Checklist

The following checklist is provided to ensure the KINO-9654G4 is properly installed.

- All the items in the packing list are present (see **Chapter 3**)
- A CPU is installed
- A CPU cooling kit is properly installed
- Compatible memory modules are properly inserted into the memory slots
- The KINO-9654G4 is installed into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices (if applicable) are properly connected
  - IDE devices
  - SATA drives
  - System front panel connector
  - Power supply
  - USB cable
  - Serial port cable
  - Keyboard/mouse cable
  - COM port cables
  - CPU/System fan cable
- The following external peripheral devices (if applicable) are properly connected to the chassis:
  - VGA screen
  - Keyboard

- Mouse
- RS-232 serial communications device
- USB devices
- LAN

5.3 CPU, CPU Cooling Kit and DIMM Installation

WARNING:

A CPU should never be turned on without the specified cooling kit being installed. If the cooling kit (heat sink and fan) is not properly installed and the system turned on, permanent damage to the CPU and other electronic components attached to the system may be incurred. Running a CPU without a cooling kit may also result in injury to the user.

The CPU, CPU cooling kit and DIMM are the most critical components of the KINO-9654G4. If any of these components is not installed, the KINO-9654G4 cannot operate.

5.3.1.1 LGA 775 CPU Installation

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure that a heat sink and CPU cooling fan are properly installed before the KINO-9654G4 is run.

If a heat sink and cooling fan are not properly installed both the CPU and the board may be damaged.

The LGA775 socket is shown in **Figure 5-1**.

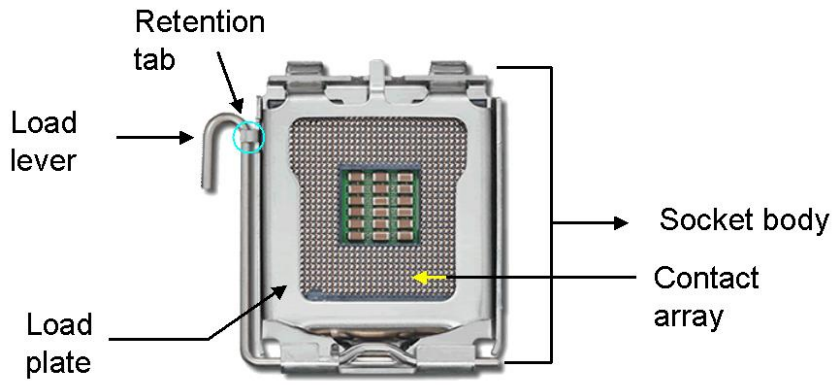


Figure 5-1: Intel LGA775 Socket

WARNING:

When handling the CPU, only hold it on the sides. DO NOT touch the pins at the bottom of the CPU.

To install Socket LGA775 CPU onto the KINO-9654G4, follow the steps below:

Step 1: **Remove the protective cover.** Remove the black protective cover by prying it off the load plate. To remove the protective cover, locate the "**REMOVE**" sign and use the fingernail to pry the protective cover off. (See **Figure 5-2**)

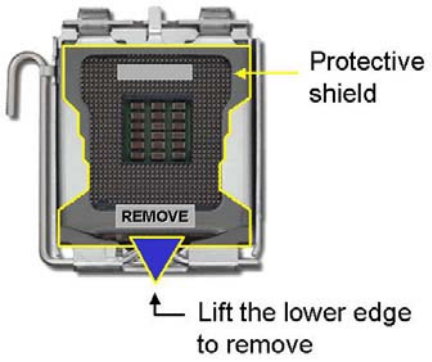


Figure 5-2: Remove the CPU Socket Protective Shield

Step 2: **Open the socket**. Disengage the load lever by pressing the lever down and slightly outward to clear the retention tab. Rotate the load lever to a fully open position. Then rotate the load plate towards the opposite direction. (See **Figure 5-3**)

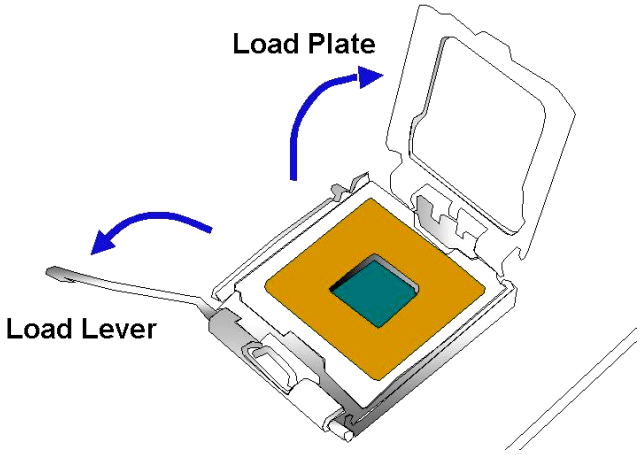


Figure 5-3: Open the CPU Socket Load Plate

Step 3: **Inspect the CPU socket** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

Step 4: **Orientate the CPU properly**. Make sure the IHS (Integrated Heat Sink) side is facing upward.

Step 5: **Correctly position the CPU.** Match the Pin 1 mark with the cut edge on the

CPU socket.

Step 6: **Align the CPU pins.** Locate pin 1 and the two orientation notches on the CPU. Carefully match the two orientation notches on the CPU with the socket alignment keys.

Step 7: **Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly. See **Figure 5-4**.

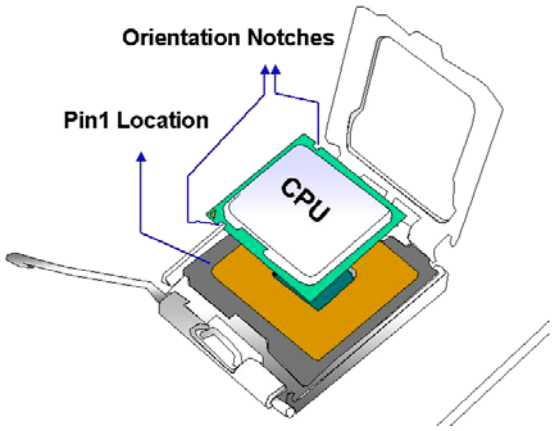


Figure 5-4: Insert the Socket LGA775 CPU

Step 8: **Close the CPU socket.** Close the load plate and engage the load lever by pushing it back to its original position. Secure the load lever under the retention tab on the side of CPU socket.

Step 9: **Connect the CPU power connector.** Connect the CPU 12V cable to the CPU 12V power connector after the cooling kit is installed.

5.3.2 Socket LGA775 Cooling Kit Installation

WARNING:

It is strongly recommended that you DO NOT use the original heat sink and cooler provided by Intel on the KINO-9654G4.

The KINO-9654G4 is vertically mounted on a horizontal backplane, and Intel's heat sink does not come with a support bracket on the soldering side, the PCB may be bent by the weight of the cooling kit.

IEI's cooling kit (CF-520 and CF-775A) includes a support bracket that is combined with the heat sink mounted on the CPU to counterweigh and balance the load on both sides of the PCB.

CF-520-RS

CF-775A-RS

Figure 5-5: IEI LGA-775 Cooling Kit

The IEI LGA775 CPU cooling kit (CF-520 and CF-775A) shown in **Figure 5-5** comprises a CPU heat sink and a cooling fan.

NOTE:

Do not wipe off (accidentally or otherwise) the pre-sprayed layer of thermal

paste on the bottom of the CF-520 heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the cooling kit follow the instructions below.

Step 1: **Place the cooling kit onto the socket LGA775 CPU**. Make sure the CPU cable can be properly routed when the cooling kit is installed.

Step 2: **Properly align the cooling kit**. Make sure the four spring screw fasteners can pass through the pre-drilled holes on the PCB.

Step 3: **Mount the cooling kit**. Gently place the cooling kit on top of the CPU. Make sure the four threaded screws on the corners of the cooling kit properly pass through the predrilled holes on the bottom of the PCB.

Step 4: **Secure the cooling kit**. From the solder side of the PCB, align the support bracket to the screw threads on heat sink that were inserted through the PCB holes. (See **Figure 5-6**)

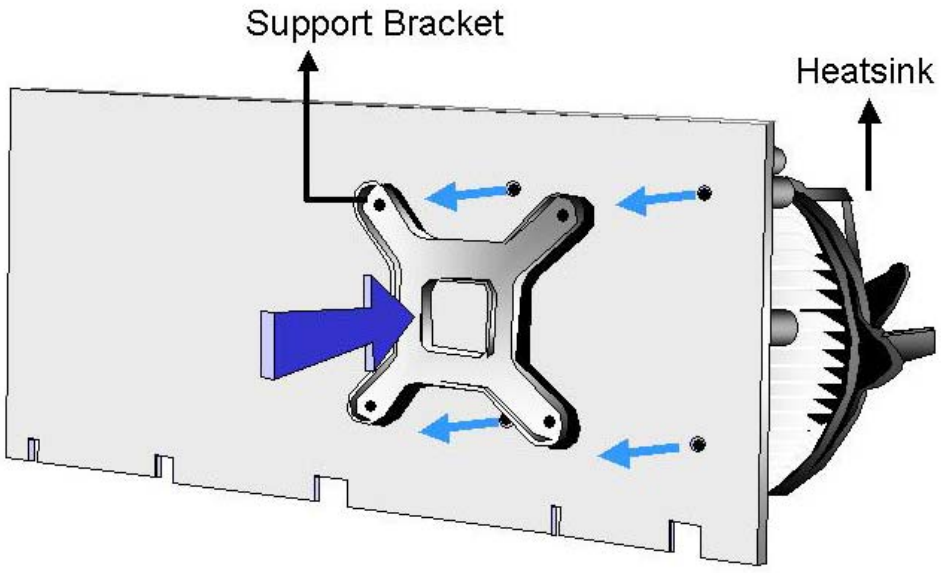


Figure 5-6: Securing the Heat sink to the PCB Board

Step 5: **Tighten the screws**. Use a screwdriver to tighten the four screws. Tighten each

nut a few turns at a time and do not over-tighten the screws.

Step 6: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the KINO-9654G4. Carefully route the cable and avoid heat generating chips and fan blades.

5.3.3 DIMM Installation

WARNING:

Using incorrectly specified DIMM may cause permanently damage the KINO-9654G4. Please make sure the purchased DIMM complies with the memory specifications of the KINO-9654G4. DIMM specifications compliant with the KINO-9654G4 are listed in **Chapter 2**.

To install a DIMM into a DIMM socket, please follow the steps below and refer to **Figure 5-7**.

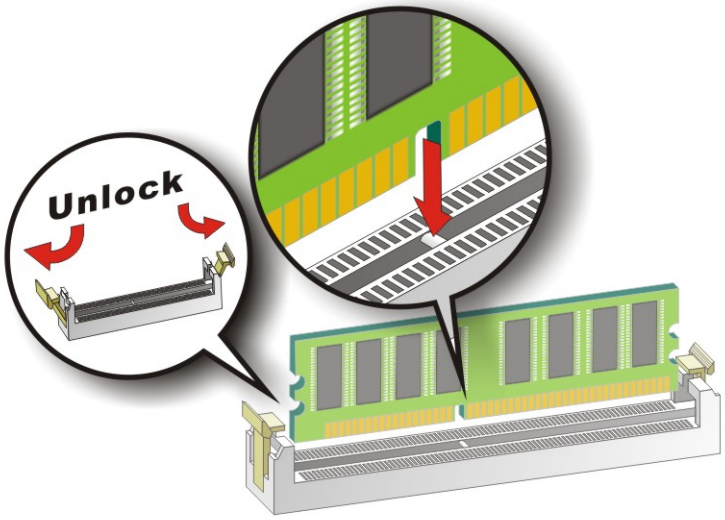


Figure 5-7: Installing a DIMM

Step 1: **Open the DIMM socket handles**. The DIMM socket has two handles that

secure the DIMM into the socket. Before the DIMM can be inserted into the socket, the handles must be opened. See **Figure 5-7**.

Step 2: **Align the DIMM with the socket**. The DIMM must be oriented in such a way that the notch in the middle of the DIMM must be aligned with the plastic bridge in the socket. See **Figure 5-7**.

Step 3: **Insert the DIMM**. Once properly aligned, the DIMM can be inserted into the socket. As the DIMM is inserted, the white handles on the side of the socket will close automatically and secure the DIMM to the socket. See **Figure 5-7**.

Step 4: **Removing a DIMM**. To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

5.4 Jumper Settings

NOTE:

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.

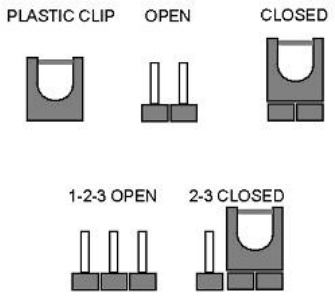


Figure 5-8: Jumpers

Before the KINO-9654G4 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the KINO-9654G4 are listed in **Table 5-1**.

Description	Label	Type
Clear CMOS	J_CMOS1	3-pin header

Table 5-1: Jumper

The KINO-9654G4 jumper location is shown in **Figure 5-9**.

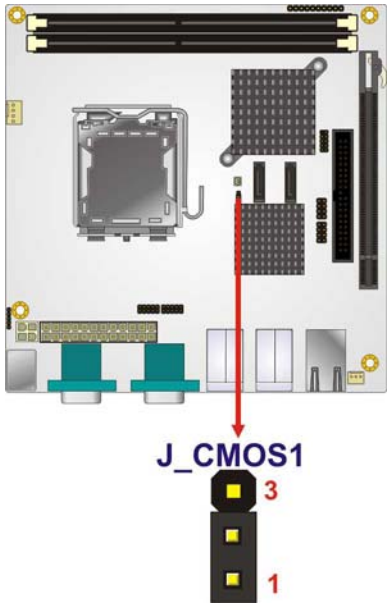


Figure 5-9: Jumper Location

5.4.1 Clear CMOS Jumper

Jumper Label: **J_CMOS1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 5-2**

Jumper Location: See **Figure 5-9**

If the KINO-9654G4 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the “CMOS Settings Wrong” message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu.

The clear CMOS jumper settings are shown in **Table 5-2**.

Clear CMOS	Description	
Short 1 - 2	Keep CMOS Setup	Default
Short 2 - 3	Clear CMOS Setup	

Table 5-2: Clear CMOS Jumper Settings

5.5 Chassis Installation

5.5.1 Airflow

WARNING

Airflow is critical to the cooling of the CPU and other onboard components. The chassis into which the KINO-9654G4 is placed must have air vents to allow proper airflow to cool the system components.

The KINO-9654G4 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel over the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow over the board surface.

NOTE

IEI has a wide range of chassis available. Please contact your KINO-9654G4 vendor, reseller or an IEI sales representative at sales@iei.com.tw or visit the IEI website (http://www.ieiworld.com.tw) to find out more about available chassis.

5.6 Internal Peripheral Device Connections

5.6.1 Peripheral Device Cables

The cables listed in **Table 5-3** are shipped with the KINO-9654G4.

Quantity	Type
1	IDE Flat Cable
2	SATA Cable
1	SATA Power Cable
1	RS-232 Adapter Cable

Table 5-3: IEI Provided Cables

5.6.2 ATA Flat Cable Connection

The ATA 66/100 flat cable connects to an IDE device. Follow the instructions below to connect an IDE HDD to the KINO-9654G4.

Step 1: **Locate the IDE connector**. The locations of the IDE device connectors are shown in **Chapter 3**.

Step 2: **Insert the connector**. Connect the IDE cable connector to the onboard connector. See **Figure 5-10**. A key on the front of the cable connector ensures it can only be inserted in one direction.

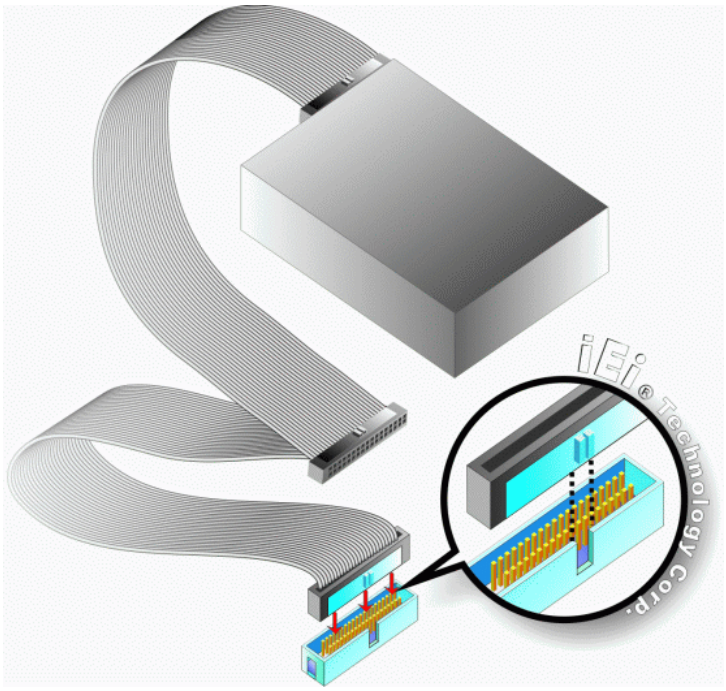


Figure 5-10: IDE Cable Connection

Step 3: **Connect the cable to an IDE device**. Connect the two connectors on the other side of the cable to one or two IDE devices. Make sure that pin 1 on the cable corresponds to pin 1 on the connector.

5.6.3 SATA Drive Connection

The KINO-9654G4 is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the SATA drive connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the onboard SATA drive connector.

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive.

Step 4: **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive.

5.6.4 Single RS-232 Cable

The single RS-232 cable consists of one serial port connector attached to a serial communications cable that is then attached to a D-sub 9 male connector. To install the single RS-232 cable, please follow the steps below.

Step 1: **Locate the connector**. The location of the RS-232 connector is shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the connector into the serial port box header. See **Figure 5-11.** A key on the front of the cable connectors ensures the connector can only be installed in one direction.

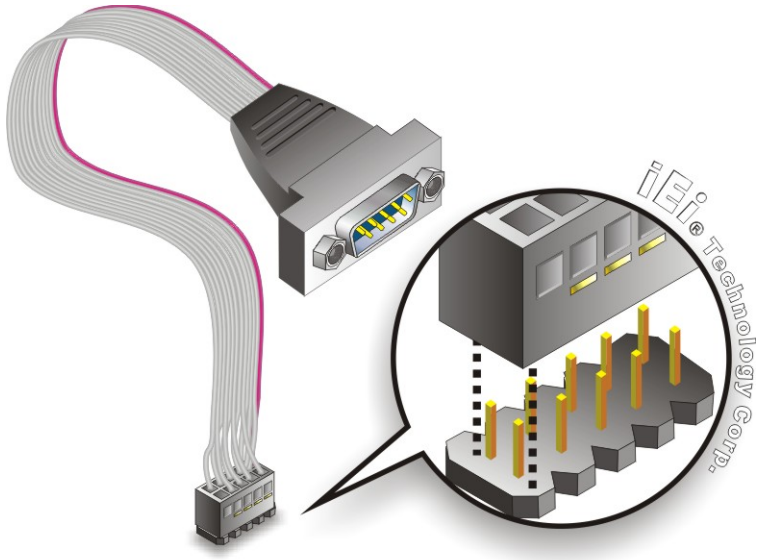


Figure 5-11: Single RS-232 Cable Installation

Step 3: **Secure the bracket**. The single RS-232 connector has two retention screws that must be secured to a chassis or bracket.

Step 4: **Connect the serial device**. Once the single RS-232 connector is connected to a chassis or bracket, a serial communications device can be connected to the

system.

5.7 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- Mouse/keyboard
- 4 x RJ-45 Ethernet cable connectors
- 3 x Serial ports
- 4 x USB devices
- VGA monitor

To connect these devices, connect the corresponding cable connector from the actual device to the corresponding KINO-9654G4 external peripheral interface connector making sure the pins are properly aligned.

5.7.1 PS/2 Keyboard and Mouse Connection

The KINO-9654G4 has a dual PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is used to connect to a keyboard and mouse to the system. Follow the steps below to connect a keyboard and mouse to the KINO-9654G4.

Step 1: **Locate the dual PS/2 connector**. The location of the dual PS/2 connector is shown in **Chapter 3**.

Step 2: **Insert the keyboard/mouse connector**. Insert a PS/2 keyboard or mouse connector into the appropriate PS/2 connector on the external peripheral interface connector. See Figure 5-12.

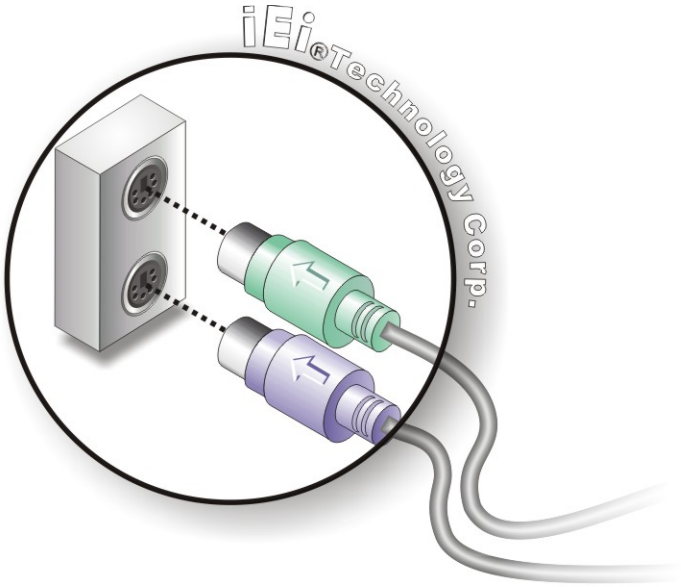


Figure 5-12: PS/2 Keyboard/Mouse Connector

5.7.2 RJ-45 Ethernet Connection

The KINO-9654G4 has two RJ-45 Ethernet connectors on the external peripheral interface panel for LAN communications. Follow the steps below to connect an RJ-45 Ethernet connector to the KINO-9654G4.

Step 1: **Locate the RJ-45 connector**. The location of the RJ-45 connector is shown in **Chapter 3**.

Step 2: **Insert an RJ-45 plug**. Insert the RJ-45 plug of a LAN into the RJ-45 receptacle on the external peripheral interface. See **Figure 5-13**.

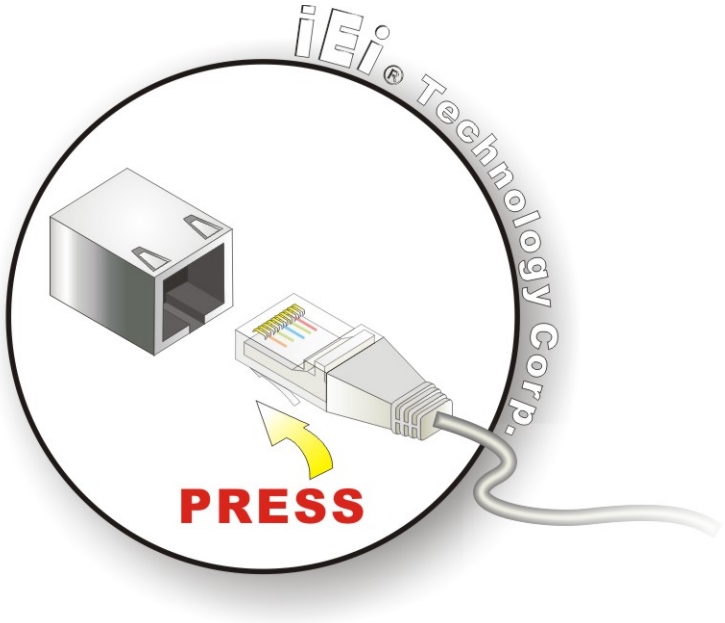


Figure 5-13: RJ-45 Ethernet Connector

5.7.3 Serial Device Connection

The KINO-9654G4 has a single female DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the KINO-9654G4.

Step 1: **Locate the DB-9 connector**. The location of the DB-9 connector is shown in **Chapter 3**.

Step 2: **Insert the serial connector**. Insert the DB-9 connector of a serial device into the DB-9 connector on the external peripheral interface. See Figure 5-14.

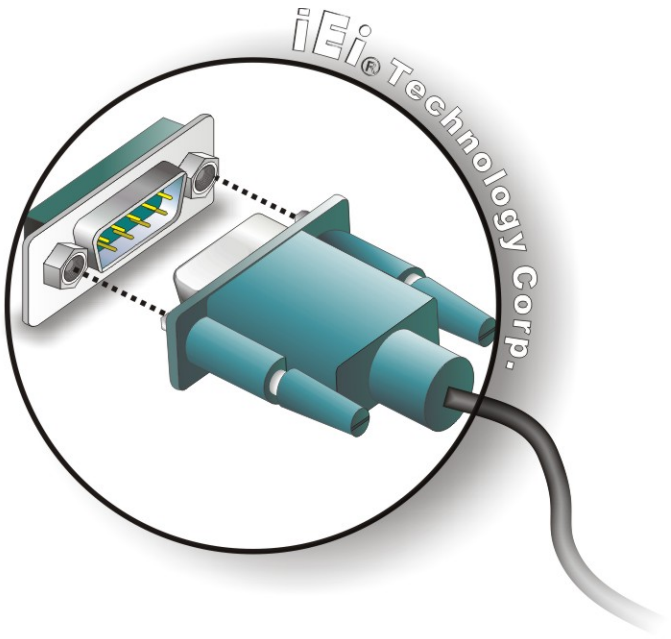


Figure 5-14: Serial Device Connector

Step 3: **Secure the connector**. Secure the serial device connector to the external interface by tightening the two retention screws on either side of the connector.

5.7.4 USB Connection (Dual Connector)

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the KINO-9654G4.

Step 1: **Locate the USB Series "A" receptacle connectors**. The location of the USB Series "A" receptacle connectors are shown in **Chapter 3**.

Step 2: **Insert a USB Series "A" plug**. Insert the USB Series "A" plug of a device into the USB Series "A" receptacle on the external peripheral interface.

See **Figure 5-15**.

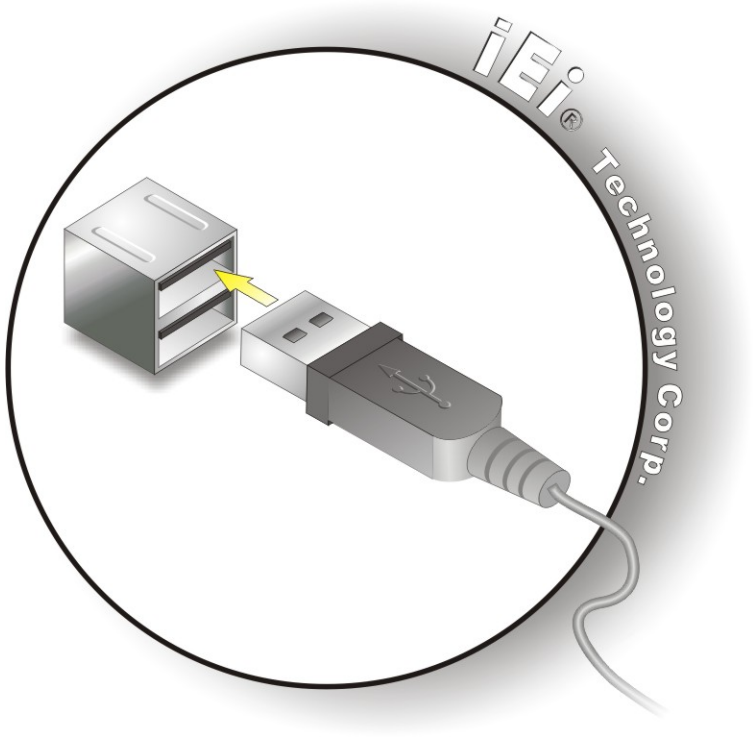


Figure 5-15: USB Connector

5.7.5 VGA Monitor Connection

The KINO-9654G4 has a single female DB-15 connector on the external peripheral interface panel for a VGA monitor. Follow the steps below to connect a VGA monitor to the KINO-9654G4.

Step 1: **Locate the DB-15 connector**. The location of the DB-15 connector is shown in **Chapter 3**.

Step 2: **Insert the VGA connector**. Insert the DB-15 connector of a VGA monitor into the DB-15 connector on the external peripheral interface. See **Figure 5-16**.

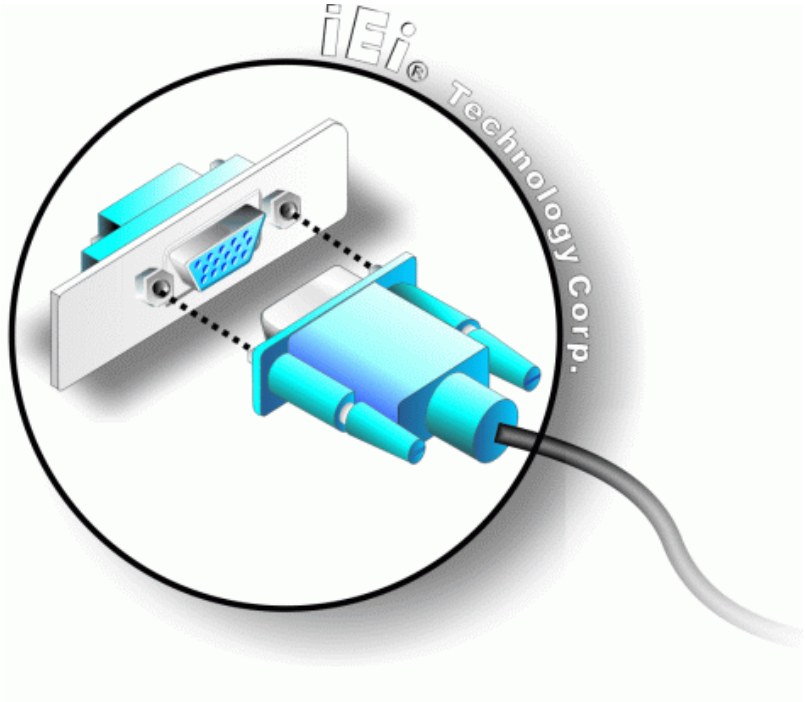


Figure 5-16: VGA Connector

Step 3: **Secure the connector**. Secure the VGA connector to the external interface by tightening the two retention screws on either side of the connector.

Chapter

6

AMI BIOS Setup

6.1 Introduction

A licensed copy of AMI BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

6.1.1 Starting Setup

The AMI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the "**Press Del to enter SETUP**" message appears on the screen. 0.

If the message disappears before the **DELETE** key is pressed, restart the computer and try again.

6.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes

F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 /F3 key	Change color from total 16 colors. F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 6-1: BIOS Navigation Keys

6.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

6.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in Chapter **Chapter 5**.

6.1.5 BIOS Menu Bar

The **menu bar** on top of the BIOS screen has the following main items:

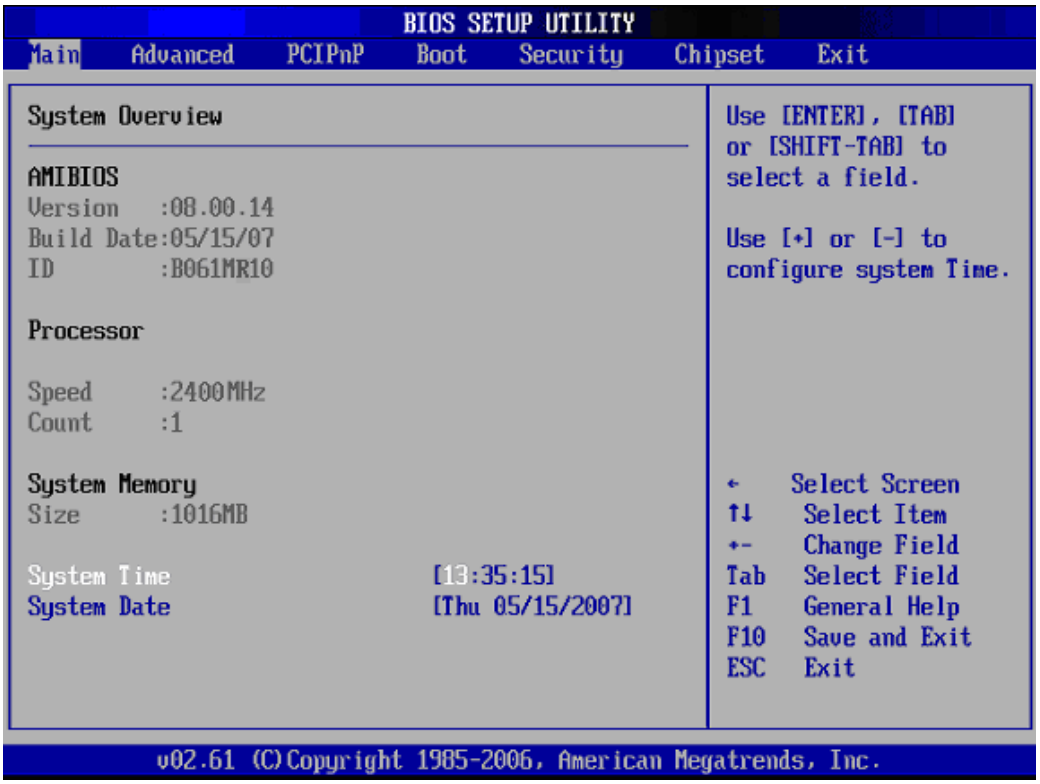
- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
- **Power** Changes power management settings.
- **Exit** Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

6.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.

The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main

➔ System Overview

The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

- **AMI BIOS**: Displays auto-detected BIOS information
  - **Version**: Current BIOS version
  - **Build Date**: Date the current BIOS version was made
  - **ID**: Installed BIOS ID
- **Processor**: Displays auto-detected CPU specifications
  - **Type**: Names the currently installed processor

- **Speed**: Lists the processor speed
- **Count**: The number of CPUs on the motherboard

- **System Memory**: Displays the auto-detected system memory.
  - **Size**: Lists memory size

The **System Overview** field also has two user configurable fields:

➔ **System Time [xx:xx:xx]**

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

6.3 Advanced

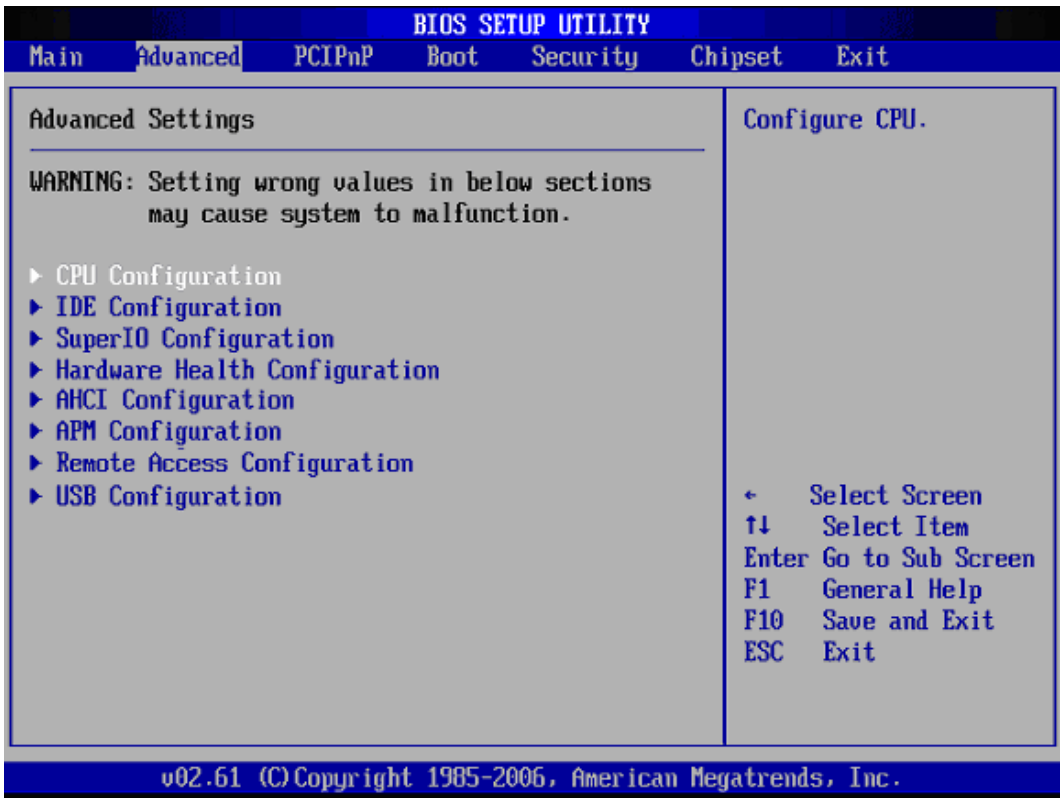
Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:

WARNING:

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

- **CPU Configuration** (see Section 6.3.1)
- **IDE Configuration** (see Section 6.3.2)
- **SuperIO Configuration** (see Section 6.3.3)
- **Hardware Health Configuration** (see Section 6.3.4)
- **AHCI Configuration** (see Section 6.3.5)
- **APM Configuration** (see Section 6.3.6)
- **Remote Access Configuration** (see Section 6.3.7)

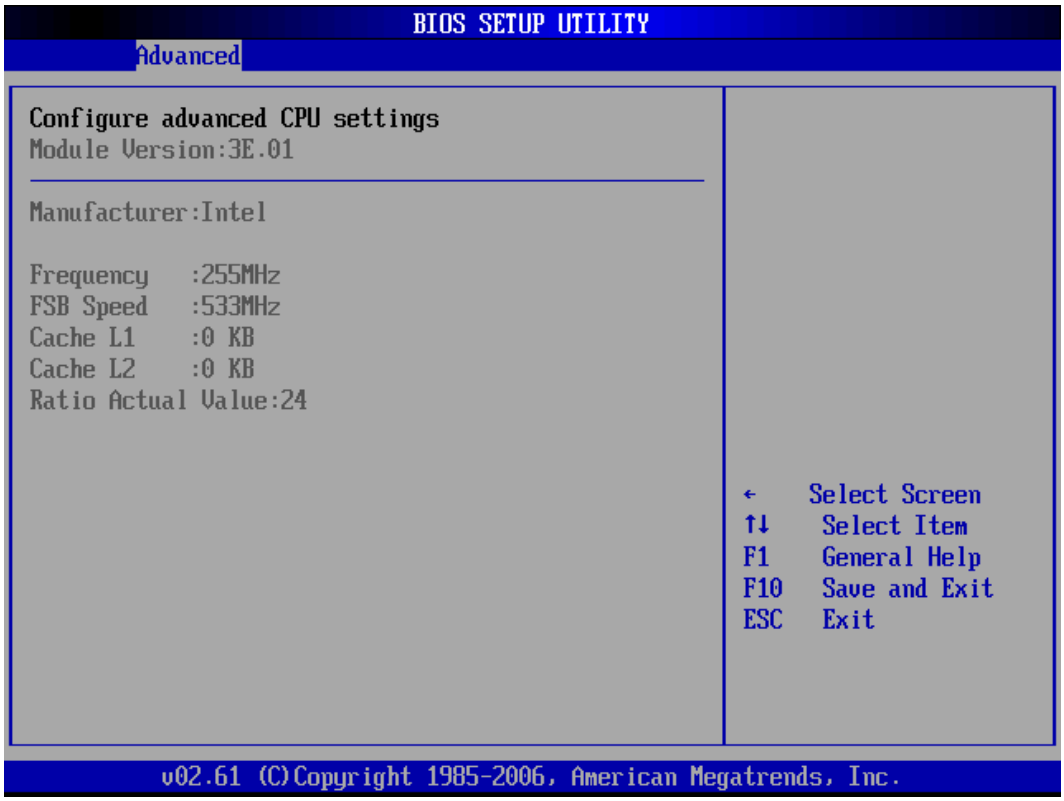
- **USB Configuration** (see Section 6.3.7)



BIOS Menu 2: Advanced

6.3.1 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 3**) to view detailed CPU specifications and configure the CPU.



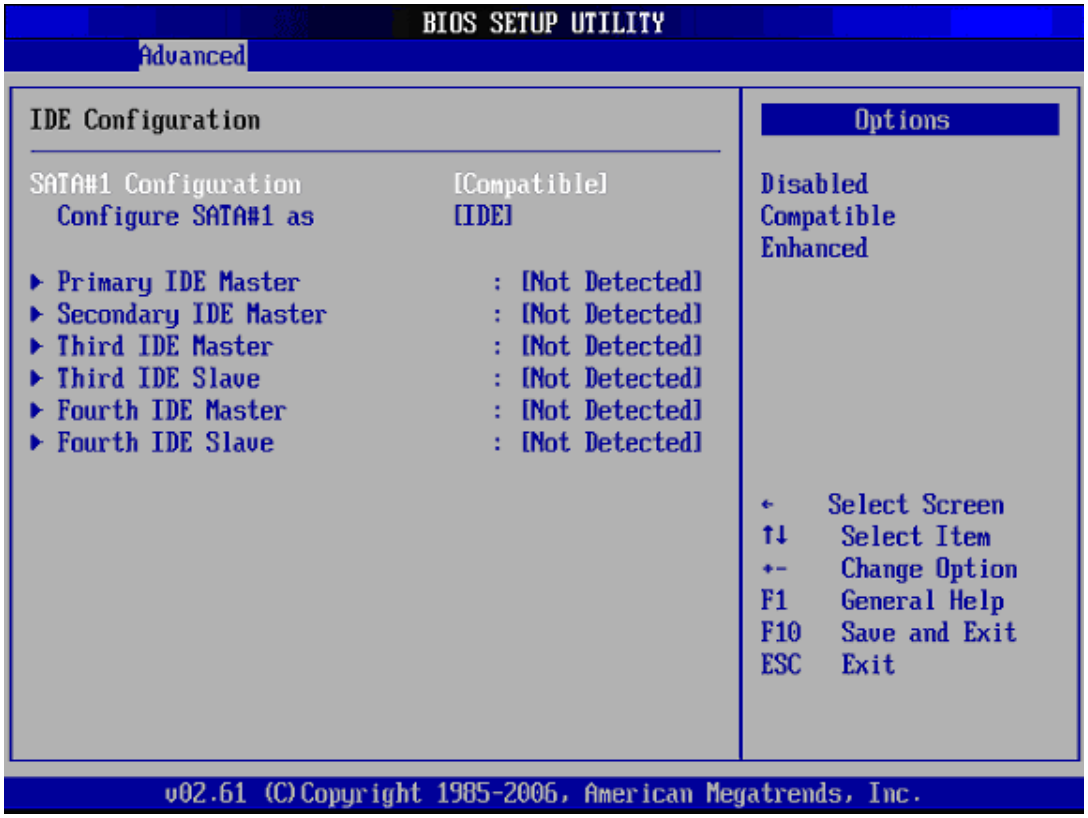
BIOS Menu 3: CPU Configuration

The CPU Configuration menu (**BIOS Menu 3**) lists the following CPU details:

- **Manufacturer**: Lists the name of the CPU manufacturer
- **Frequency:** Lists the CPU processing speed
- **FSB Speed**: Lists the FSB speed
- **Cache L1**: Lists the CPU L1 cache size
- **Cache L2**: Lists the CPU L2 cache size
- Ratio Actual Value:

6.3.2 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 4**) to change and/or set the configuration of the IDE devices installed in the system.



BIOS Menu 4: IDE Configuration

➔ **SATA#1 Compatible**

Use the **SATA#1 Compatible** BIOS option to select the configuration mode or disable the SATA 1 drive.

➔ **Disabled**		SATA 1 drive is disabled
➔ **Compatible**	**DEFAULT**	SATA 1 drive is in compatible mode
➔ **Enhanced**		SATA 1 drive is in enhanced mode

➔ **Configure SATA#1 as [IDE]**

Use the **Configure SATA#1 as** BIOS option to select the mode for the SATA 1 drive.

➔ **IDE**	**DEFAULT**	SATA 1 is configured as an IDE device

➔ **AHCI** SATA 1 is configured as an AHCI device

➔ **IDE Master and IDE Slave**

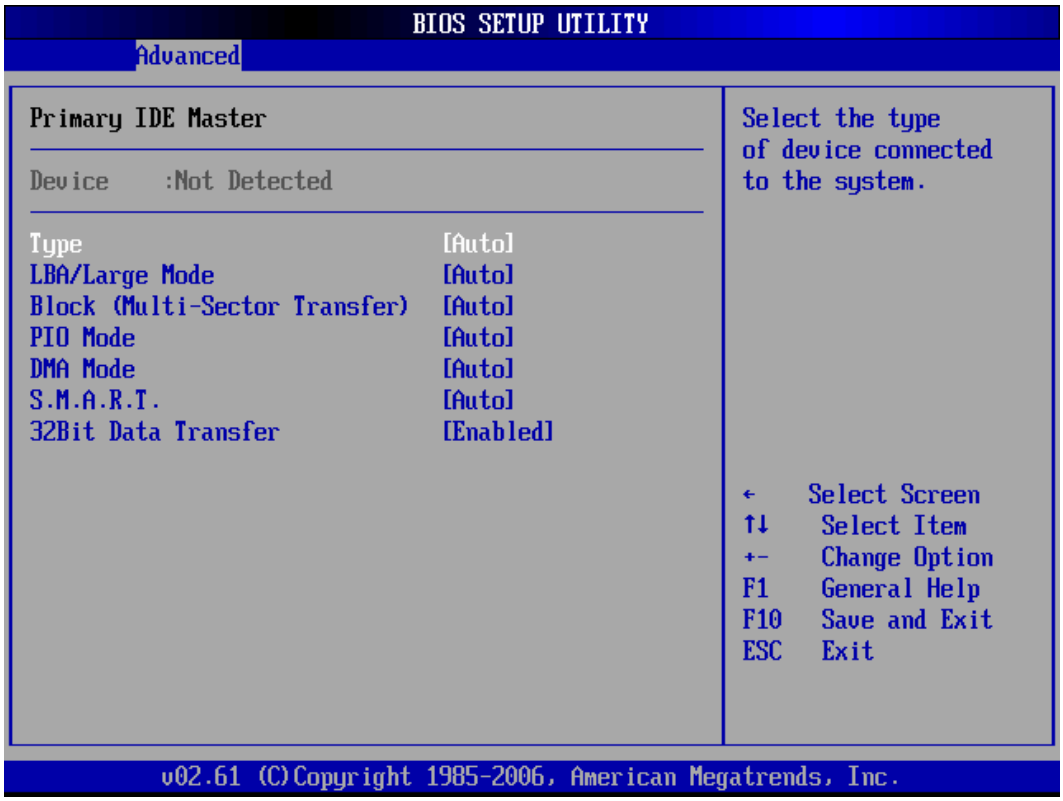
When entering setup, BIOS auto detects the presence of IDE devices. BIOS displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

- Primary IDE Master
- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 6.3.2.1** appear.

6.3.2.1 IDE Master, IDE Slave

Use the **IDE Master** and **IDE Slave** configuration menu to view both primary and secondary IDE device details and configure the IDE devices connected to the system.



BIOS Menu 5: IDE Master and IDE Slave Configuration

➔ **Auto-Detected Drive Parameters**

The “grayed-out” items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

- **Device**: Lists the device type (e.g. hard disk, CD-ROM etc.)
- **Type**: Indicates the type of devices a user can manually select
- **Vendor**: Lists the device manufacturer
- **Size**: List the storage capacity of the device.
- **LBA Mode**: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- **Block Mode**: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.

- **PIO Mode**: Indicates the PIO mode of the installed device.
- **Async DMA**: Indicates the highest Asynchronous DMA Mode that is supported.
- **Ultra DMA**: Indicates the highest Synchronous DMA Mode that is supported.
- **S.M.A.R.T.**: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
- **32Bit Data Transfer**: Enables 32-bit data transfer.

➔ **Type [Auto]**

Use the **Type** BIOS option select the type of device the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) is complete.

➔ **Not Installed**		BIOS is prevented from searching for an IDE disk drive on the specified channel.
➔ **Auto**	**DEFAULT**	The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.
➔ **CD/DVD**		The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.
➔ **ARMD**		This option specifies an ATAPI Removable Media Device. These include, but are not limited to: ➔ **ZIP** ➔ **LS-120**

➔ **LBA/Large Mode [Auto]**

Use the **LBA/Large Mode** option to disable or enable BIOS to auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

➔ **Disabled**		BIOS is prevented from using the LBA mode control on the specified channel.
➔ **Auto**	**DEFAULT**	BIOS auto detects the LBA mode control on the specified channel.

➔ **Block (Multi Sector Transfer) [Auto]**

Use the **Block (Multi Sector Transfer)** to disable or enable BIOS to auto detect if the device supports multi-sector transfers.

➔ **Disabled**		BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.
➔ **Auto**	**DEFAULT**	BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported the data transfer to and from the device occurs multiple sectors at a time.

➔ **PIO Mode [Auto]**

Use the **PIO Mode** option to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

➔ **Auto**	**DEFAULT**	BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.

- ➔ **0** PIO mode 0 selected with a maximum transfer rate of 3.3MBps
- ➔ **1** PIO mode 1 selected with a maximum transfer rate of 5.2MBps
- ➔ **2** PIO mode 2 selected with a maximum transfer rate of 8.3MBps
- ➔ **3** PIO mode 3 selected with a maximum transfer rate of 11.1MBps
- ➔ **4** PIO mode 4 selected with a maximum transfer rate of 16.6MBps

  (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

Use the **DMA Mode** BIOS selection to adjust the DMA mode options.

- ➔ **Auto** **DEFAULT** BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.
- ➔ **SWDMA0** Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1MBps
- ➔ **SWDMA1** Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2MBps
- ➔ **SWDMA2** Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3MBps
- ➔ **MWDMA0** Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2MBps
- ➔ **MWDMA1** Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3MBps
- ➔ **MWDMA2** Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6MBps

- ➔ **UDMA1** Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps
- ➔ **UDMA1** Ultra DMA mode 1 selected with a maximum data transfer rate of 25MBps
- ➔ **UDMA2** Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3MBps
- ➔ **UDMA3** Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
- ➔ **UDMA4** Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
- ➔ **UDMA5** Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **S.M.A.R.T [Auto]**

Use the **S.M.A.R.T** option to auto-detect, disable or enable Self-Monitoring Analysis and Reporting Technology (SMART) on the drive on the specified channel. **S.M.A.R.T** predicts impending drive failures. The **S.M.A.R.T** BIOS option enables or disables this function.

- ➔ **Auto** **DEFAULT** BIOS auto detects HDD SMART support.
- ➔ **Disabled** Prevents BIOS from using the HDD SMART feature.
- ➔ **Enabled** Allows BIOS to use the HDD SMART feature

➔ **32Bit Data Transfer [Enabled]**

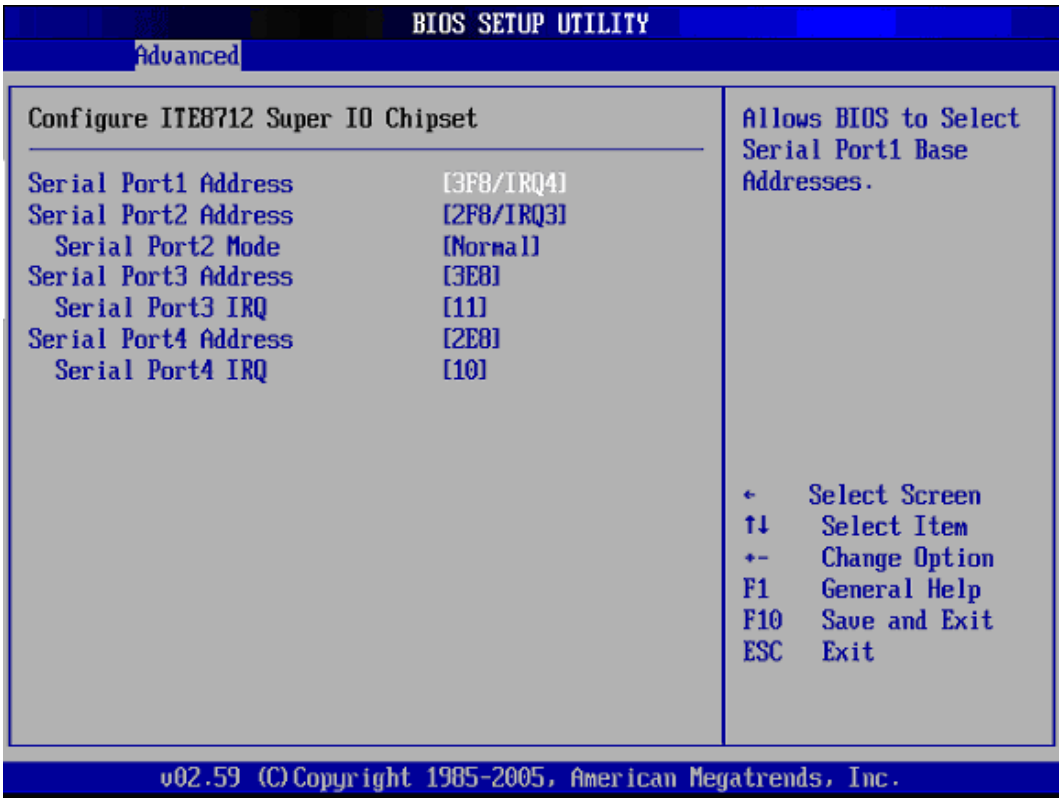
Use the **32Bit Data Transfer** BIOS option to enables or disable 32-bit data transfers.

➔ **Disabled** Prevents the BIOS from using 32-bit data transfers.

➔ **Enabled** **DEFAULT** Allows BIOS to use 32-bit data transfers on supported hard disk drives.

6.3.3 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 6**) to set or change the configurations for the serial ports.



BIOS Menu 6: Super IO Configuration

➔ **Serial Port1 Address [3F8/IRQ4]**

Use the **Serial Port1 Address** option to select the Serial Port 1 base address.

➔ **Disabled** No base address is assigned to Serial Port 1

- ➔ **3F8/IRQ4** **DEFAULT** Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4
- ➔ **3E8/IRQ4** Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4
- ➔ **2E8/IRQ3** Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Address [2F8/IRQ3]**

Use the **Serial Port2 Address** option to select the Serial Port 2 base address.

- ➔ **Disabled** No base address is assigned to Serial Port 2
- ➔ **2F8/IRQ3** **DEFAULT** Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3
- ➔ **3E8/IRQ4** Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4
- ➔ **2E8/IRQ3** Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Mode [Normal]**

Use the **Serial Port2 Mode** option to select the Serial Port2 operational mode.

- ➔ **Normal** **DEFAULT** Serial Port 2 mode is normal
- ➔ **IrDA** Serial Port 2 mode is IrDA
- ➔ **ASK IR** Serial Port 2 mode is ASK IR

➔ **Serial Port3 Address [3E8]**

Use the **Serial Port3 Address** option to select the base addresses for serial port 3

➔ **Disabled**		No base address is assigned to serial port 3
➔ **3E8**	**DEFAULT**	Serial port 3 I/O port address is 3E8
➔ **2E8**		Serial port 3 I/O port address is 2E8
➔ **2F0**		Serial port 3 I/O port address is 2F0
➔ **2E0**		Serial port 3 I/O port address is 2E0

➔ **Serial Port3 IRQ [11]**

Use the **Serial Port3 IRQ** option to select the interrupt address for serial port 3.

➔ **10**		Serial port 3 IRQ address is 10
➔ **11**	**DEFAULT**	Serial port 3 IRQ address is 11

➔ **Serial Port4 Address [2E8]**

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

➔ **Disabled**		No base address is assigned to serial port 3
➔ **3E8**		Serial port 4 I/O port address is 3E8
➔ **2E8**	**DEFAULT**	Serial port 4 I/O port address is 2E8
➔ **2F0**		Serial port 4 I/O port address is 2F0
➔ **2E0**		Serial port 4 I/O port address is 2E0

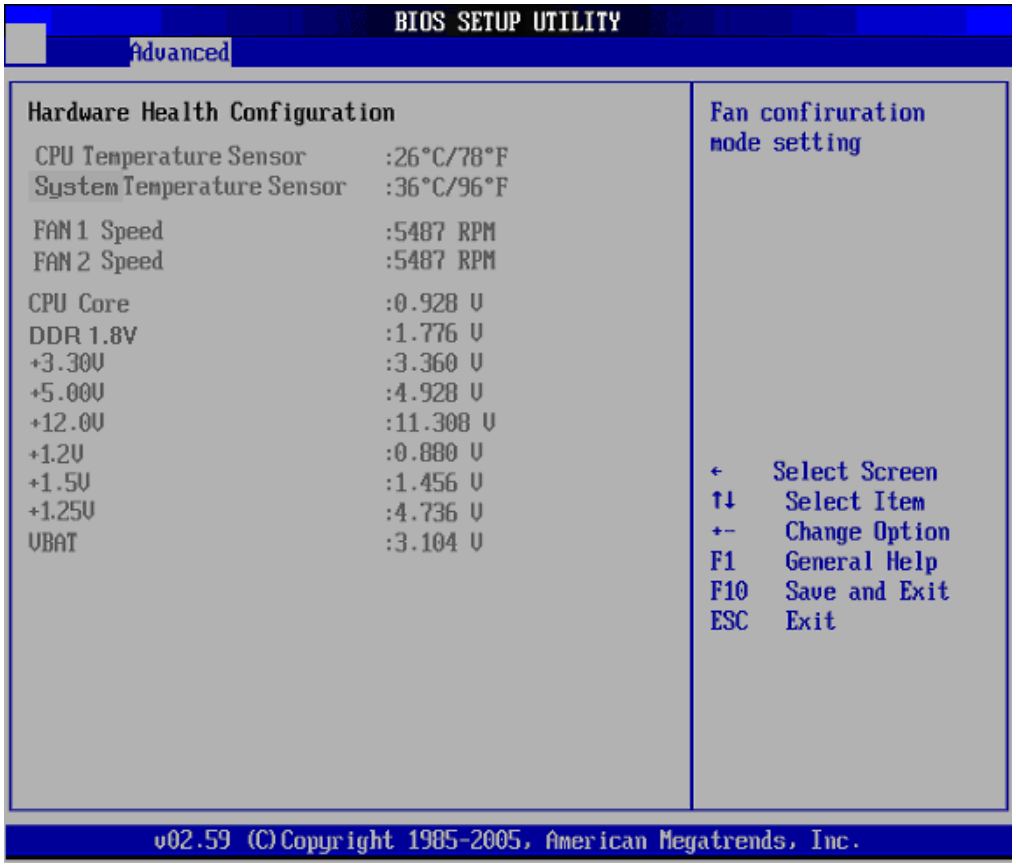
➔ **Serial Port4 IRQ [10]**

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

➔ **10**	**DEFAULT**	Serial port 4 IRQ address is 10
➔ **11**		Serial port 4 IRQ address is 11

6.3.4 Hardware Health Configuration

The **Hardware Health Configuration** menu (**BIOS Menu 7**) shows the operating temperature, fan speeds and system voltages.



BIOS Menu 7: Hardware Health Configuration

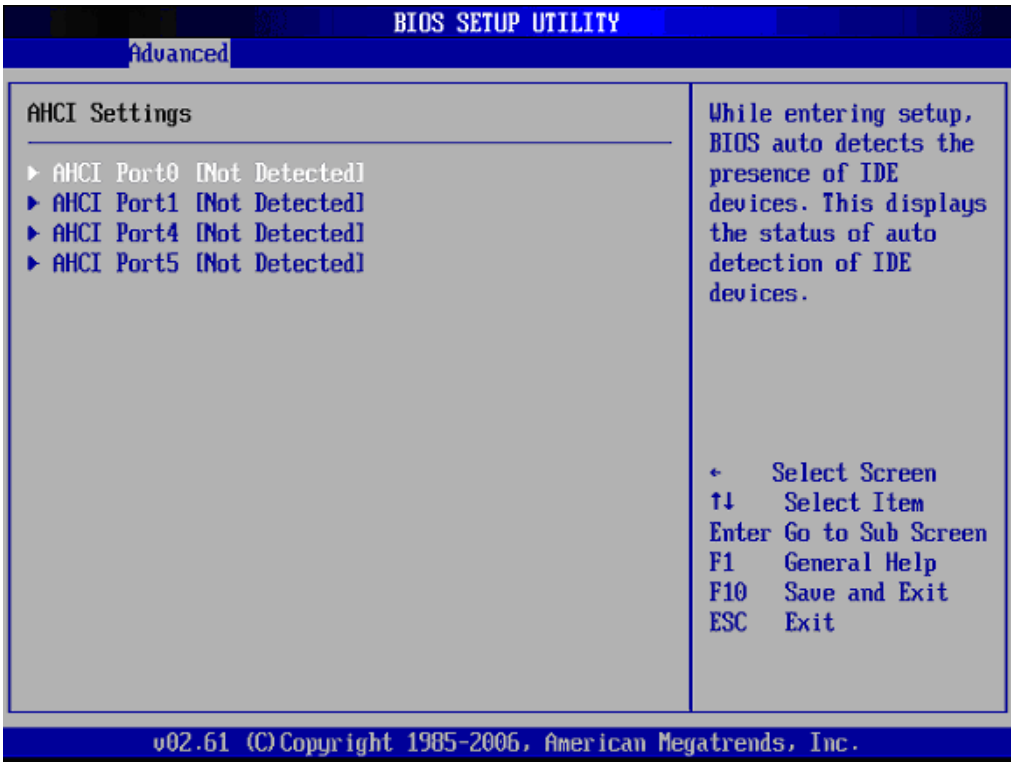
The following system parameters and values are shown. The system parameters that are monitored are:

- **System Temperatures**: The following system temperatures are monitored
  - CPU Temperature Sensor
  - System Temperature Sensor
- **Fan Speeds**: The CPU cooling fan speed is monitored.
  - Fan1 Speed
  - Fan2 Speed
- **Voltages**: The following system voltages are monitored

- CPU Core
- DDR2 1.8V
- +3.30V
- +5.00V
- +12.0V
- FSB 1.2V
- +1.5V
- +1.25V
- VBAT

6.3.5 AHCI Configuration

The **AHCI Settings** menu reports on the auto-detection of IDE devices connected to the system.


BIOS SETUP UTILITY
Advanced
AHCI Settings
AHCI Port0 [Not Detected]
AHCI Port1 [Not Detected]
AHCI Port4 [Not Detected]
AHCI Port5 [Not Detected]
While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.

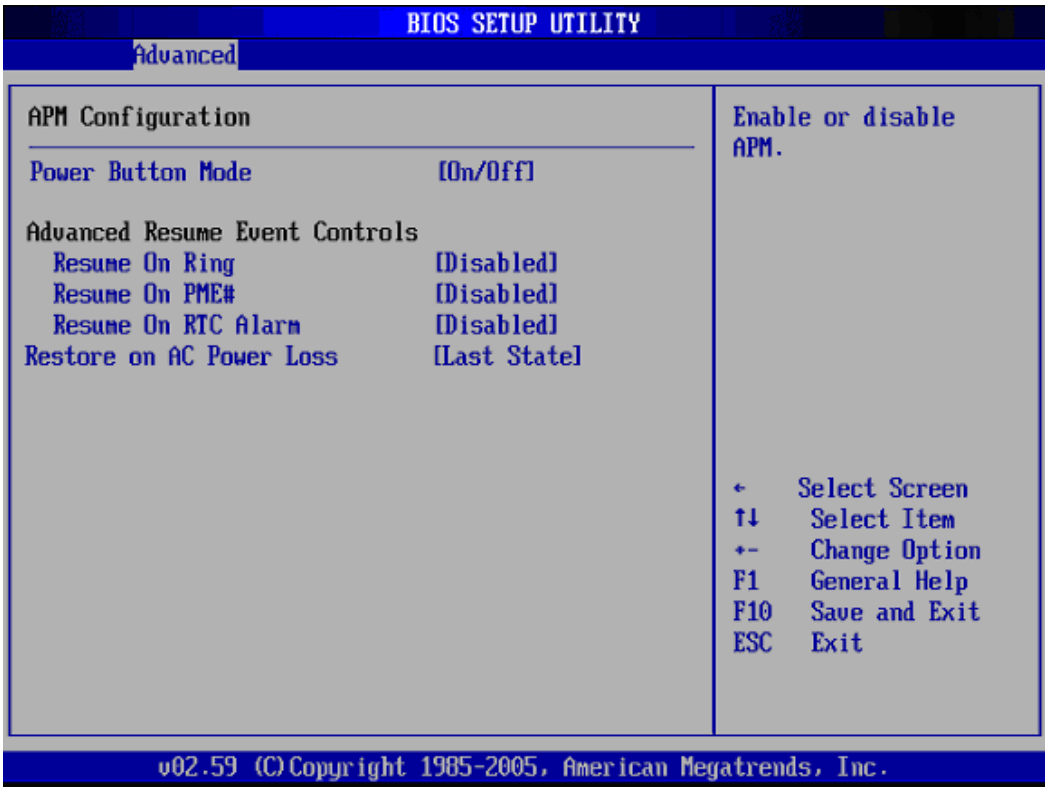
BIOS Menu 8: AHCI Configuration

➔ **AHCI Port n [Not Detected]**

Use the **AHCI Port n** BIOS option to check what AHCI (Advanced Host Controller Interface) devices are detected by the system. This option displays the status of the auto detection of IDE devices.

6.3.6 APM Configuration

The APM Configuration menu (**BIOS Menu 9**) allows the advanced power management options to be configured.



BIOS Menu 9:Advanced Power Management Configuration

➔ **Power Button Mode [On/Off]**

Use the **Power Button Mode** BIOS to specify how the power button functions.

➔ **On/Off** **DEFAULT** When the power button is pressed the system is either

turned on or off

➔ **Suspend** When the power button is pressed the system goes into suspend mode

➔ **Resume on Ring [Disabled]**

Use the **Resume on Ring** BIOS option to enable activity on the RI (ring in) modem line to rouse the system from a suspend or standby state. That is, the system will be roused by an incoming call on a modem.

➔ **Disabled** **DEFAULT** Wake event not generated by an incoming call

➔ **Enabled** Wake event generated by an incoming call

➔ **Resume on PME# [Disabled]**

Use the **Resume on PME#** BIOS option to enable activity on the PCI PME (power management event) controller to rouse the system from a suspend or standby state.

➔ **Disabled** **DEFAULT** Wake event not generated by PCI PME controller activity

➔ **Enabled** Wake event generated by PCI PME controller activity

➔ **Resume On RTC Alarm [Disabled]**

Use the **Resume On RTC Alarm** to specify when the computer is roused from a suspended state.

➔ **Disabled** **DEFAULT** The real time clock (RTC) cannot generate a wake event

➔ **Enabled** If selected, the following will appear with values that can be selected:

➔ **RTC Alarm Date (Days)**

➔ **System Time**

After setting the alarm, the computer will turn itself on from a suspend state when the alarm goes off.

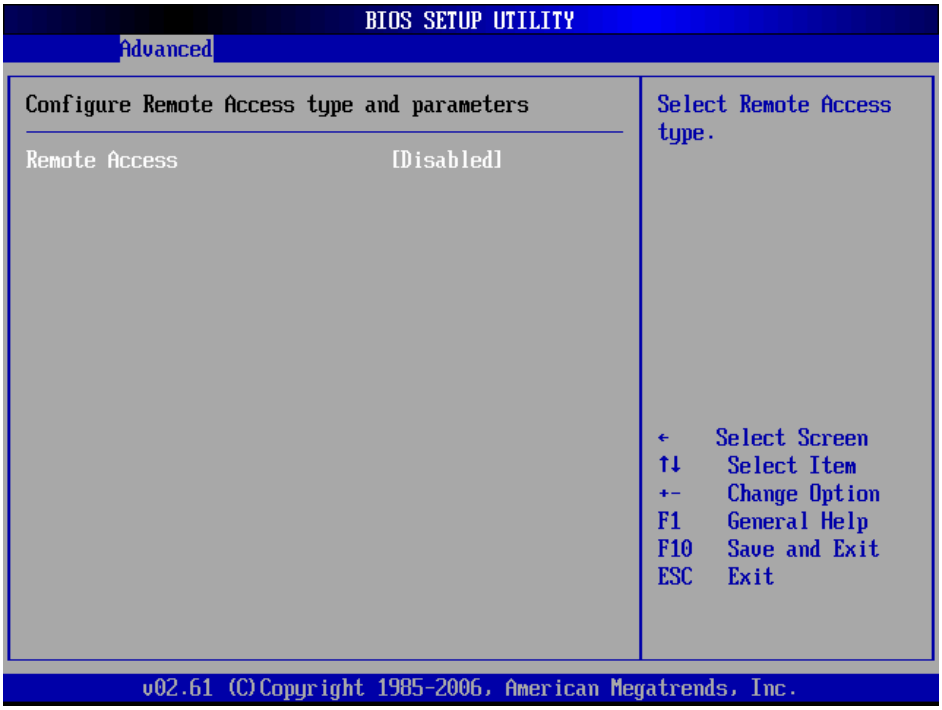
➔ **Restore on AC Power Loss [Power Off]**

Use the **Restore on AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

➔ **Power Off**	**DEFAULT**	The system remains turned off
➔ **Power On**		The system turns on
➔ **Last State**		The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

6.3.7 Remote Access Configuration

Use the **Remote Access Configuration** menu (**BIOS Menu 10**) to configure remote access parameters. The **Remote Access Configuration** is an AMIBIOS feature and allows a remote host running a terminal program to display and configure the BIOS settings.



BIOS Menu 10: Remote Access Configuration [Advanced]

➔ **Remote Access [Disabled]**

Use the **Remote Access** option to enable or disable access to the remote functionalities of the system.

➔ **Disabled** **DEFAULT** Remote access is disabled.

➔ **Enabled** Remote access configuration options shown below appear:

- ➔ **Serial Port Number**
- ➔ **Serial Port Mode**
- ➔ **Redirection after BIOS POST**
- ➔ **Terminal Type**

These configuration options are discussed below.

➔ **Serial Port Number [COM1]**

Use the **Serial Port Number** option to select the serial port used for remote access.

➔ **COM1**	**DEFAULT**	System is remotely accessed through COM1
➔ **COM2**		System is remotely accessed through COM2
➔ **COM3**		System is remotely accessed through COM3
➔ **COM4**		System is remotely accessed through COM4

NOTE: Make sure the selected COM port is enabled through the Super I/O configuration menu.

➔ **Base Address, IRQ [3F8h,4]**

The **Base Address, IRQ** option cannot be configured and only shows the interrupt address of the serial port listed above.

➔ **Serial Port Mode [115200 8,n,1]**

Use the **Serial Port Mode** option to select baud rate through which the console redirection is made. The following configuration options are available

- 115200 8,n,1 **DEFAULT**
- 57600 8,n,1
- 38400 8,n,1
- 19200 8,n,1
- 09600 8,n,1

NOTE:

Identical baud rate setting musts be set on the host (a management computer running a terminal software) and the slave

➔ **Redirection After BIOS POST [Always]**

Use the **Redirection After BIOS POST** option to specify when console redirection should occur.

➔ **Disabled**		The console is not redirected after POST
➔ **Boot Loader**		Redirection is active during POST and during Boot Loader
➔ **Always**	**DEFAULT**	Redirection is always active (Some OSes may not work if set to Always)

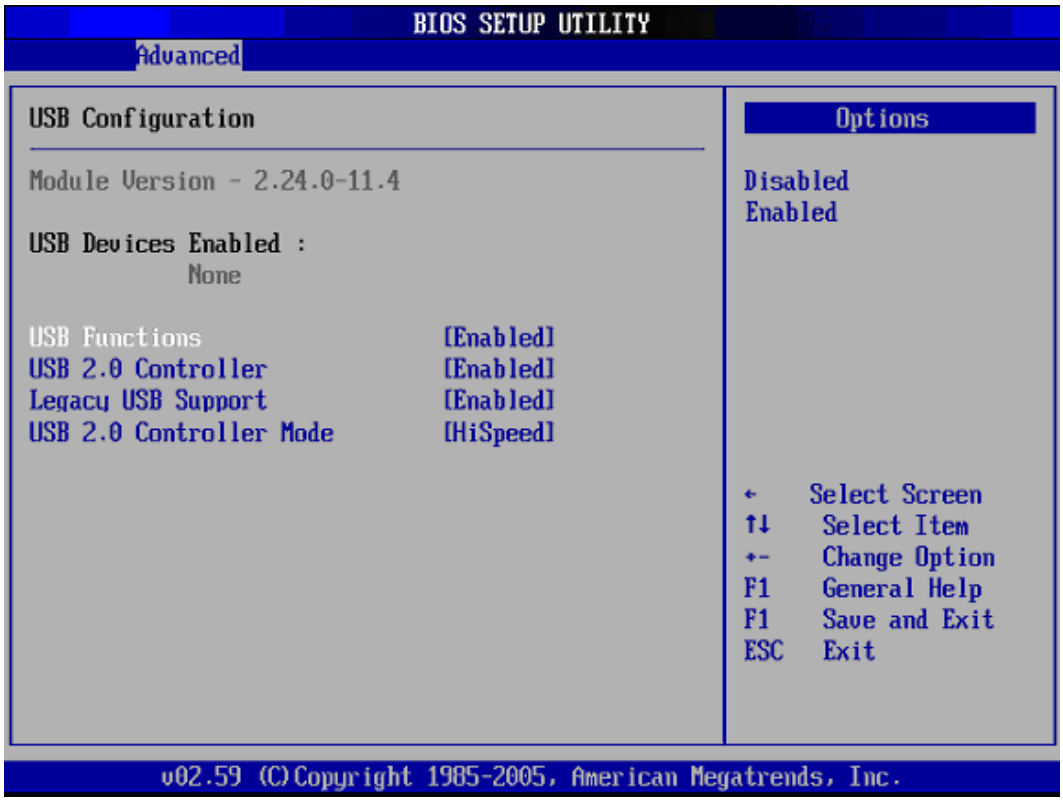
➔ **Terminal Type [ANSI]**

Use the **Terminal Type** BIOS option to specify the remote terminal type.

➔ **ANSI**	**DEFAULT**	The target terminal type is ANSI
➔ **VT100**		The target terminal type is VT100
➔ **VT-UTF8**		The target terminal type is VT-UTF8

6.3.8 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 11**) to read USB configuration information and configure the USB settings.



BIOS Menu 11: USB Configuration

➔ **USB Functions [Enabled]**

Use the **USB Function** BIOS option to enable or disable USB function support.

➔ **Disabled**		USB function support disabled
➔ **Enabled**	**DEFAULT**	USB function support enabled

➔ **USB 2.0 Controller [Enabled]**

Use the **USB 2.0 Controller** BIOS option to enable or disable the USB 2.0 controller

➔ **Disabled**		USB 2.0 controller disabled
➔ **Enabled**	**DEFAULT**	USB 2.0 controller enabled

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

➔ **Disabled**		Legacy USB support disabled
➔ **Enabled**	**DEFAULT**	Legacy USB support enabled
➔ **Auto**		Legacy USB support disabled if no USB devices are connected

➔ **USB2.0 Controller Mode [HiSpeed]**

Use the **USB2.0 Controller Mode** option to set the speed of the USB2.0 controller.

➔ **FullSpeed**		The controller is capable of operating at 12Mb/s
➔ **HiSpeed**	**DEFAULT**	The controller is capable of operating at 480Mb/s

6.4 PCI/PnP

Use the PCI/PnP menu (**BIOS Menu 12**) to configure advanced PCI and PnP settings.

WARNING:

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.

BIOS Menu 12: PCI/PnP Configuration

➔ **IRQ# [Available]**

Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

➔ **Available** **DEFAULT** The specified IRQ is available to be used by PCI/PnP devices

➔ **Reserved** The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5
- IRQ7
- IRQ9

- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

➔ **DMA Channel# [Available]**

Use the **DMA Channel#** option to assign a specific DMA channel to a particular PCI/PnP device.

➔ **Available**	**DEFAULT**	The specified DMA is available to be used by PCI/PnP devices
➔ **Reserved**		The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0
- DM Channel 1
- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

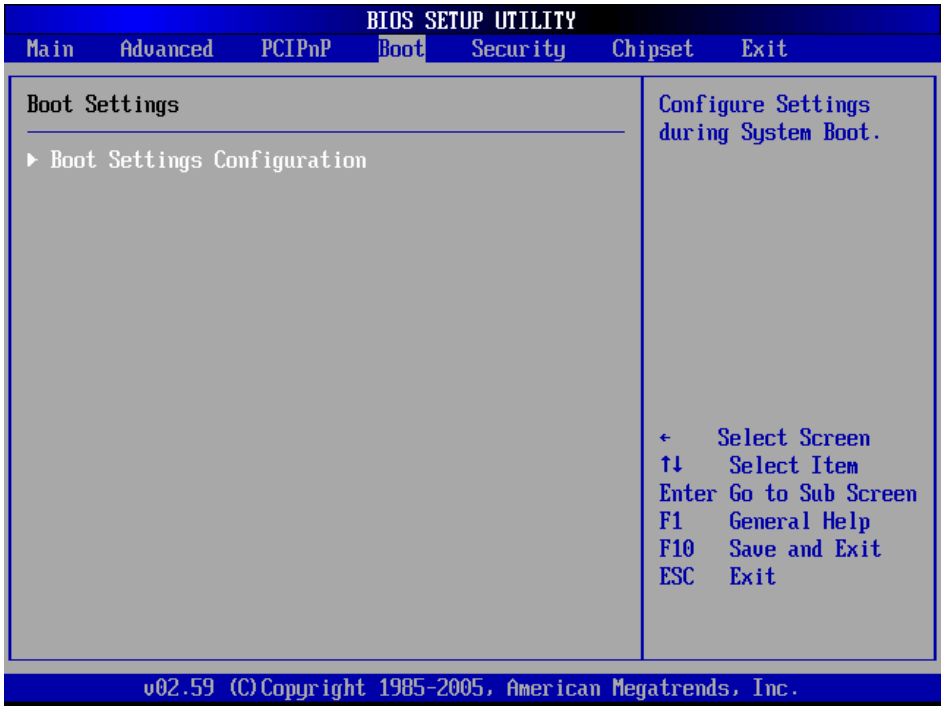
➔ **Reserved Memory Size [Disabled]**

Use the **Reserved Memory Size** BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

➔ **Disabled**	**DEFAULT**	No memory block reserved for legacy ISA devices
➔ **16K**		16KB reserved for legacy ISA devices
➔ **32K**		32KB reserved for legacy ISA devices
➔ **64K**		54KB reserved for legacy ISA devices

6.5 Boot

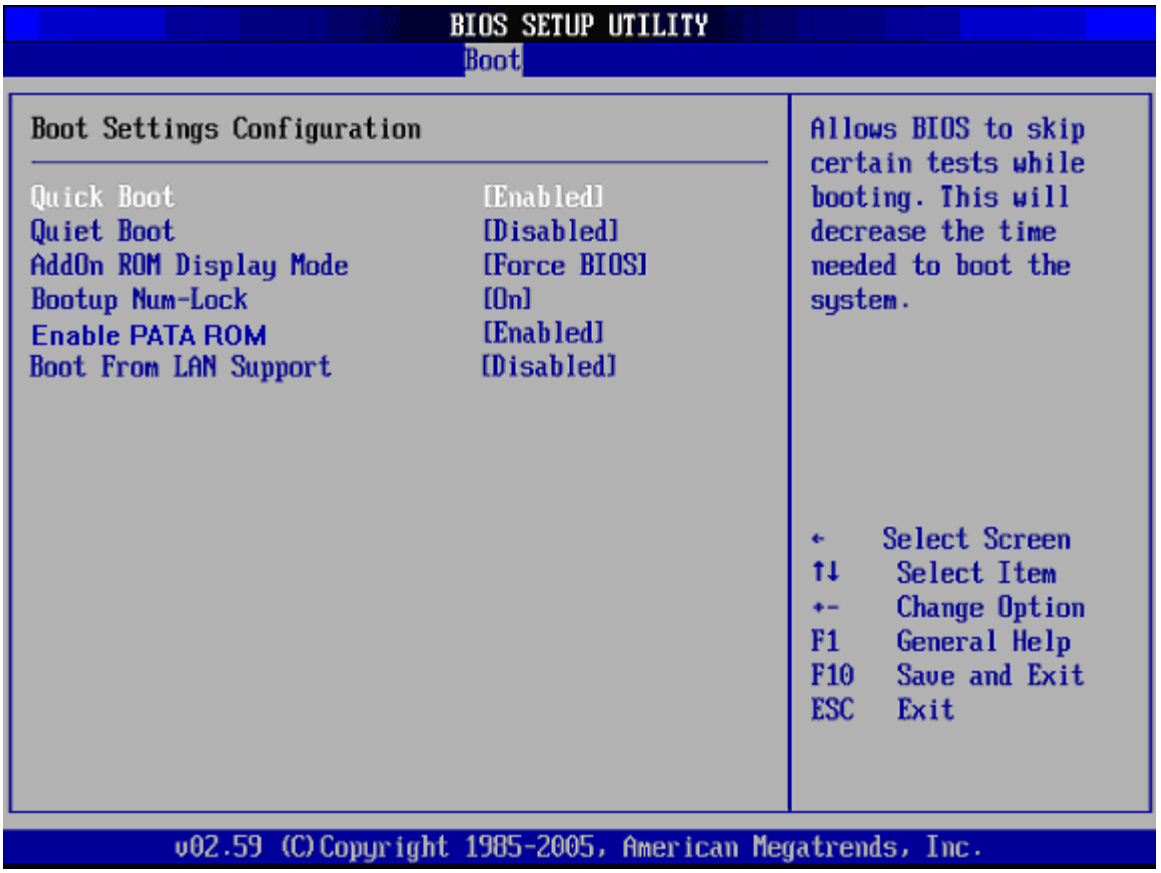
Use the Boot menu (**BIOS Menu 13**) to configure system boot options.



BIOS Menu 13: Boot

6.5.1 Boot Settings Configuration

Use the Boot Settings Configuration menu (**BIOS Menu 13**) to configure advanced system boot options.


BIOS SETUP UTILITY
Boot
Boot Settings Configuration
Quick Boot [Enabled]
Quiet Boot [Disabled]
AddOn ROM Display Mode [Force BIOS]
Bootup Num-Lock [On]
Enable PATA ROM [Enabled]
Boot From LAN Support [Disabled]
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.59 (C)Copyright 1985-2005, American Megatrends, Inc.

BIOS Menu 14: Boot Settings Configuration

➔ **Quick Boot [Enabled]**

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

➔ **Disabled**		No POST procedures are skipped
➔ **Enabled**	**DEFAULT**	Some POST procedures are skipped to decrease the system boot time

➔ **Quiet Boot [Disabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔ **Disabled**	**DEFAULT**	Normal POST messages displayed

➔ **Enabled** OEM Logo displayed instead of POST messages

➔ **AddOn ROM Display Mode [Force BIOS]**

Use the **AddOn ROM Display Mode** option to allow add-on ROM (read-only memory) messages to be displayed.

➔ **Force BIOS** **DEFAULT** The system forces third party BIOS to display during system boot.

➔ **Keep Current** The system displays normal information during system boot.

➔ **Bootup Num-Lock [On]**

Use the **Bootup Num-Lock** BIOS option to specify if the number lock setting must be modified during boot up.

➔ **Off** Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

➔ **On** **DEFAULT** Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

➔ **Enable PATA ROM [Enabled] disabled**

Use the **Enable PATA ROM** option to enable or disable PATA ROM (read-only memory).

➔ **Disabled** The PATA ROM is disabled.

➔ **Enabled** **DEFAULT** The PATA ROM is enabled.

➔ **Boot From LAN Support [Disabled]**

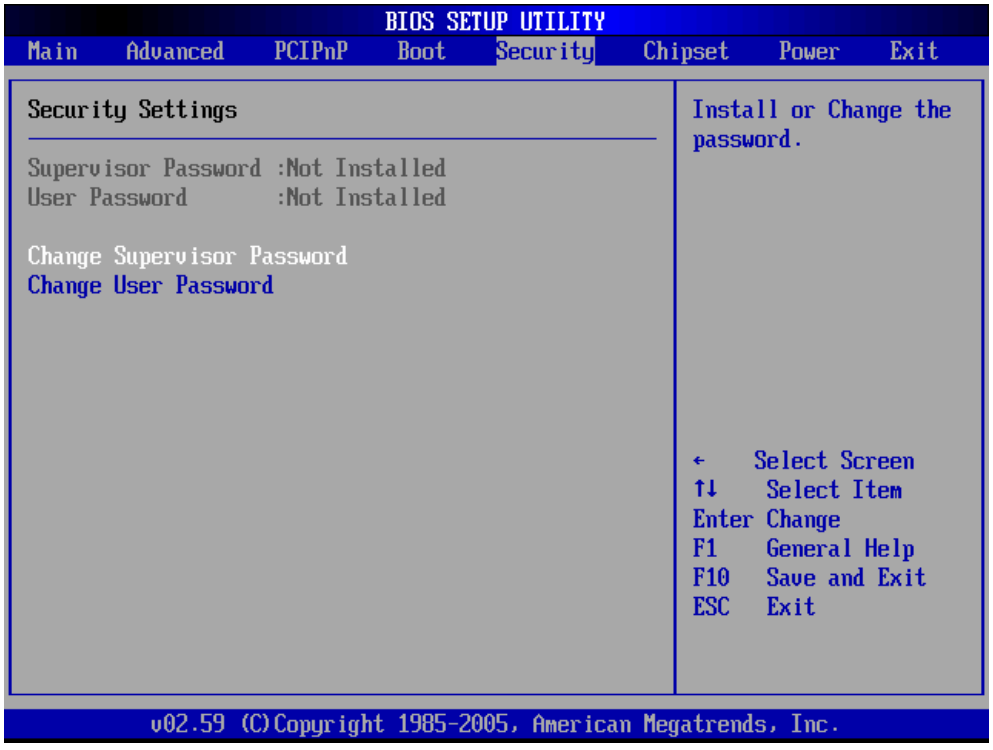
Use the **BOOT From LAN Support** option to enable the system to be booted from a remote system.

➔ **Disabled** **DEFAULT** Cannot be booted from a remote system through the LAN

➔ **Enabled** Can be booted from a remote system through the LAN

6.6 Security

Use the Security menu (**BIOS Menu 15**) to set system and user passwords.



BIOS Menu 15: Security

➔ **Change Supervisor Password**

Use the **Change Supervisor Password** to set or change a supervisor password. The default for this option is **Not Installed**. If a supervisor password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change Supervisor Password**.

➔ **Change User Password**

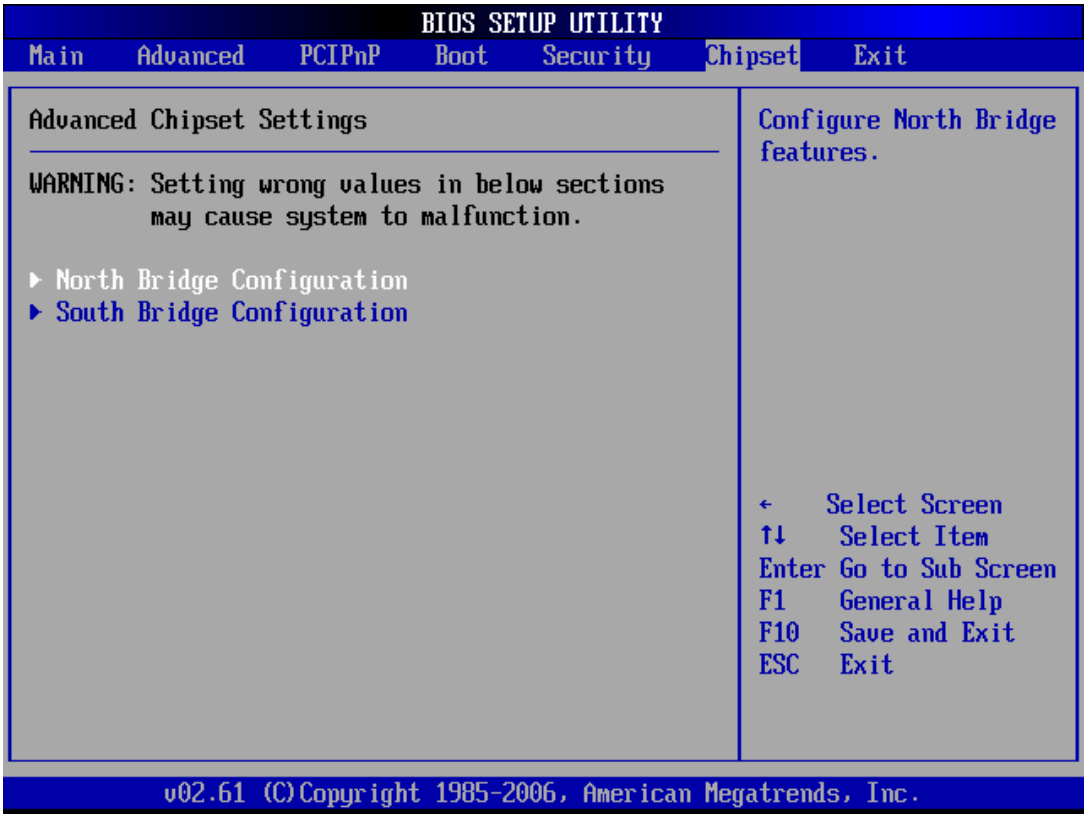
Use the **Change User Password** to set or change a user password. The default for this option is **Not Installed**. If a user password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change User Password**.

6.7 Chipset

Use the **Chipset** menu (**BIOS Menu 16**) to access the NorthBridge and SouthBridge configuration menus

WARNING!

Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Advanced Chipset Settings
WARNING: Setting wrong values in below sections
may cause system to malfunction.
North Bridge Configuration
South Bridge Configuration
Configure North Bridge features.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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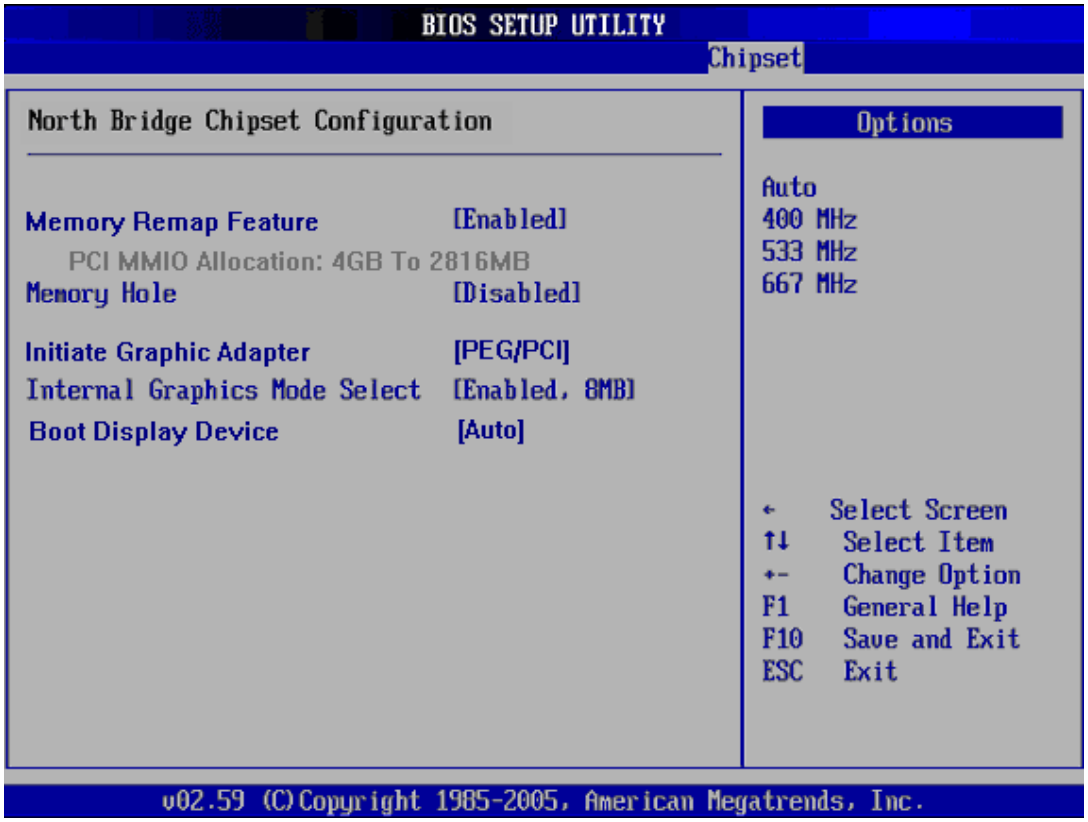
BIOS Menu 16: Chipset

6.7.1 NorthBridge Configuration

Use the NorthBridge Configuration menu (**BIOS Menu 16**) to configure the northbridge chipset.



BIOS Menu 17:NorthBridge Chipset Configuration

➔ **Memory Remap Feature [Enabled]**

Use the **Primary Graphics Adapter** option to allow the system to re-map the PCI memory overlapped above the total physical memory.

➔ **Disabled**	**DEFAULT**	Memory re-mapping not allowed.
➔ **Enabled**		Memory re-mapping allowed.

➔ **Memory Hole [Disabled]**

Use the **Memory Hole** option to reserve memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly. If an older ISA expansion card is used, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

➔ **Disabled** **DEFAULT** Memory is not reserved for ISA expansion cards

➔ **15MB – 16MB** Between 15MB and 16MB of memory is reserved for ISA expansion cards

➔ **Initiate Graphics Adapter [PEG/PCI]**

Use the **Initiate Graphic Adapter** option to select the graphics controller used as the primary boot device. Select either an integrated graphics controller (IGD) or a combination of PCI graphics controller, a PCI express (PEG) controller or an IGD. Configuration options are listed below:

- IGD
- PCI/IGD
- PCI/PEG
- PEG/IGD
- PEG/PCI **DEFAULT**

➔ **Internal Graphics Mode Select [Enable, 8MB]**

Use the **Internal Graphic Mode Select** option to specify the amount of system memory that can be used by the Internal graphics device.

➔ **Disable**

➔ **Enable, 1MB** 1MB of memory used by internal graphics device

➔ **Enable, 8MB** **DEFAULT** 8MB of memory used by internal graphics device

➔ **Boot Display Device [Auto]**

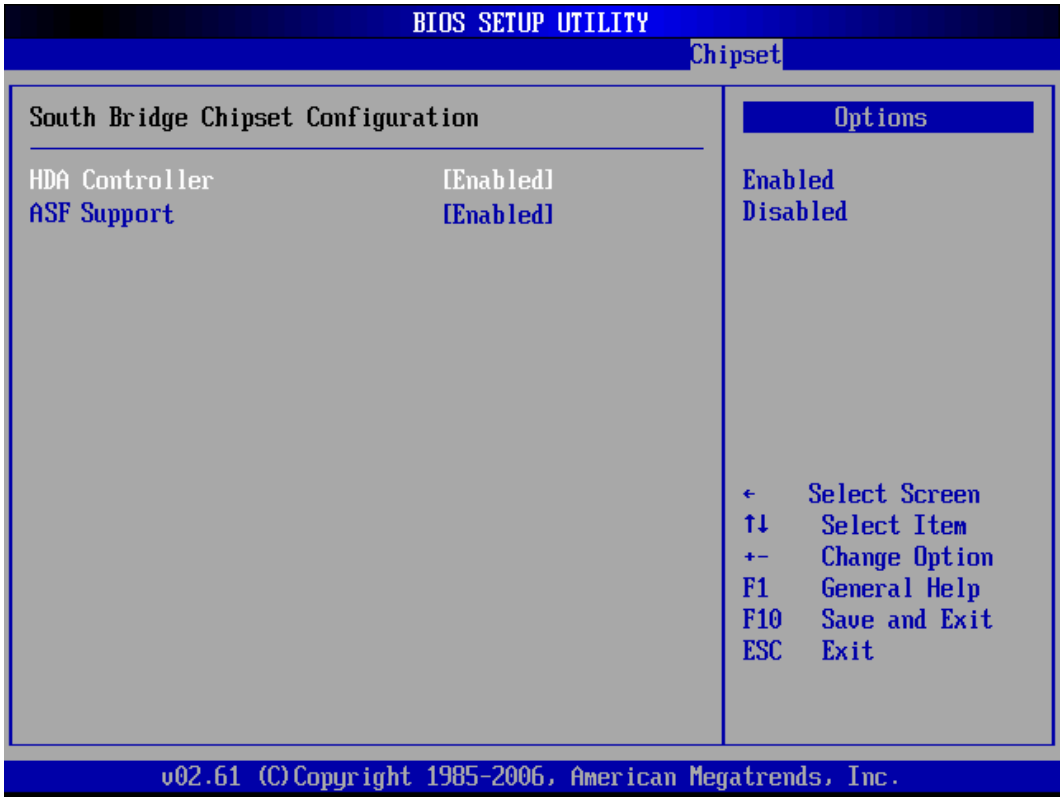
The **Boot Display Device** BIOS option selects the display device the system uses when it boots. The available options are listed below:

- Auto **DEFAULT**
- CRT
- CRT1

- CRT + CRT1

6.7.2 SouthBridge Configuration

The **SouthBridge Configuration** menu (**BIOS Menu 18**) the southbridge chipset to be configured.



BIOS Menu 18:SouthBridge Chipset Configuration

➔ **HDA Controller [Enabled]**

Use the **HDA Controller** option to enable the high definition audio controller.

➔ **Disabled** HDA controller disabled

➔ **Enabled** **DEFAULT** HDA controller enabled

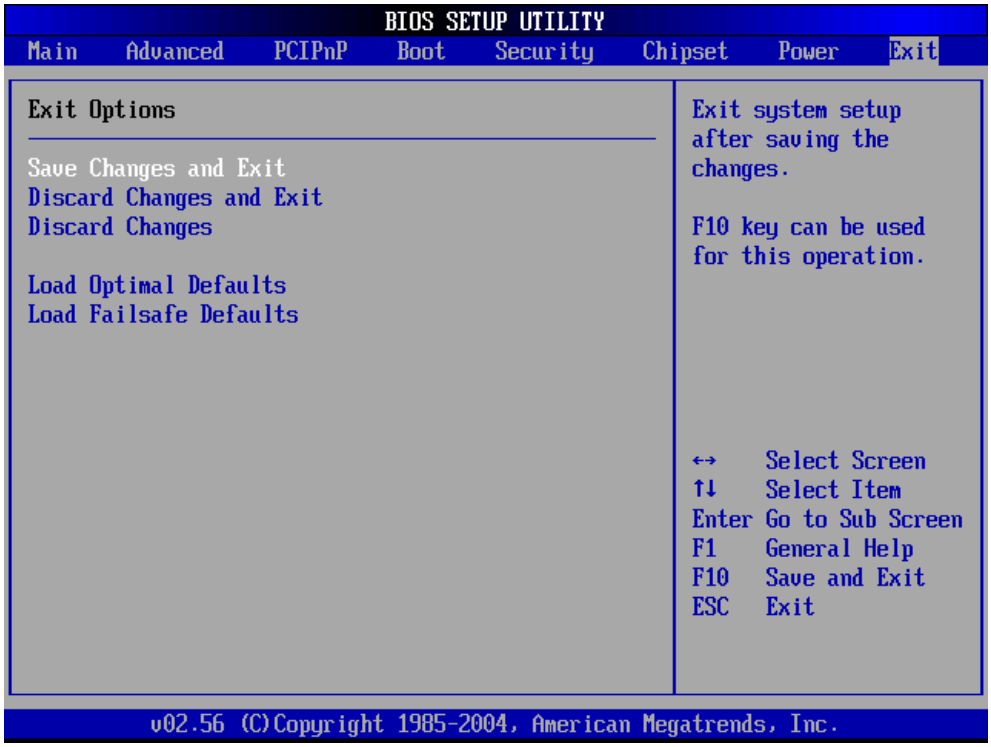
➔ **ASF Support [Enabled]**

Use the **ASF Support** BIOS option to control the system's ability to connect to a remote management server.

➔ **Disabled**		The system will not communicate with a remote management server.
➔ **Enabled**	**DEFAULT**	The Alert Standard Format (ASF) controller is activated and can communicate with a remote management server.

6.8 Exit

Use the **Exit** menu (**BIOS Menu 19**) to load default BIOS values, optimal failsafe values and to save configuration changes.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Power Exit
Exit Options
Save Changes and Exit
Discard Changes and Exit
Discard Changes
Load Optimal Defaults
Load Failsafe Defaults
Exit system setup after saving the changes.
F10 key can be used for this operation.
↔ Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
v02.56 (C)Copyright 1985-2004, American Megatrends, Inc.

BIOS Menu 19:Exit

➔ **Save Changes and Exit**

Use the **Save Changes and Exit** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ **Discard Changes and Exit**

Use the **Discard Changes and Exit** option to exit the BIOS configuration setup program without saving the changes made to the system.

➔ **Discard Changes**

Use the **Discard Changes** option to discard the changes and remain in the BIOS configuration setup program.

➔ **Load Optimal Defaults**

Use the **Load Optimal Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F9 key can be used for this operation.**

➔ **Load Failsafe Defaults**

Use the **Load Failsafe Defaults** option to load failsafe default values for each of the parameters on the Setup menus. **F8 key can be used for this operation.**

Chapter

7

Software Drivers

7.1 Available Software Drivers

NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The following drivers can be installed on the system:

- Intel® Chipset driver
- VGA driver (Intel® Graphics Media Accelerator Driver)
- Audio driver (Realtek HD Audio Driver (ALC883))
- SATA driver (Intel® Matrix Storage Manager)
- IDE controller (IT8211)
- LAN Driver

Installation instructions are given below.

7.2 Driver CD Auto-run

All the drivers for the KINO-9654G4 are on the CD that came with the system. To install the drivers, please follow the steps below.

Step 1: Insert the CD into a CD drive connected to the system.

NOTE:

If the system does not initiate the "autorun" program when the CD is inserted, click the **Start** button, select **Run**, then type **X:\autorun.exe** (where **X:** is the system CD drive) to access the IEI Driver CD main menu.

Step 2: The driver main menu appears (**Figure 7-1**).

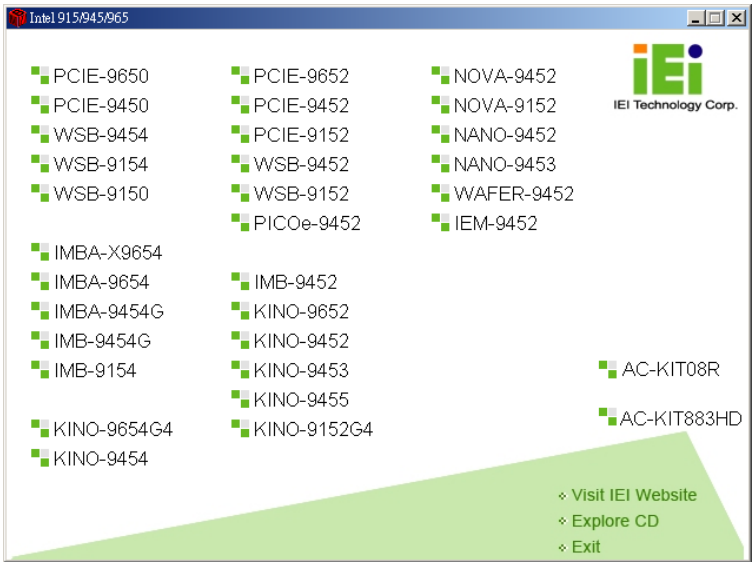


Figure 7-1: Introduction Screen

Step 3: Click KINO-9654G4.

Step 4: A new screen with a list of available drivers appears (**Figure 7-2**).

Figure 7-2: Available Drivers

Step 5: Select the driver to install from the list in **Figure 7-2**. Detailed driver installation instructions follow below.

7.3 Chipset Driver Installation

To install the chipset driver, please follow the steps below.

Step 1: Select **INF** from the list in **Figure 7-2**.

Step 2: A new window opens (**Figure 7-3**).

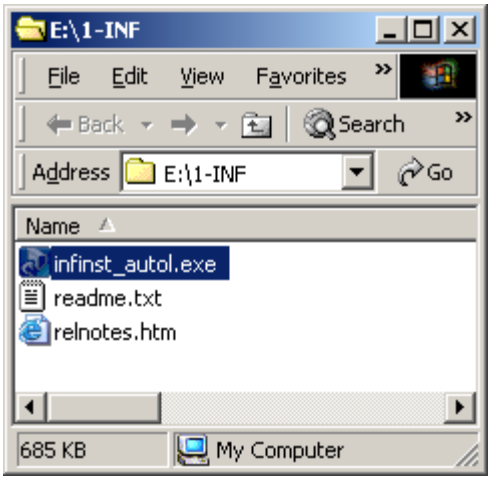


Figure 7-3: Chipset Driver Installation Program

Step 3: Double-click the **infinst_Autol.exe** icon.

Step 4: The welcome screen in **Figure 7-4** appears.

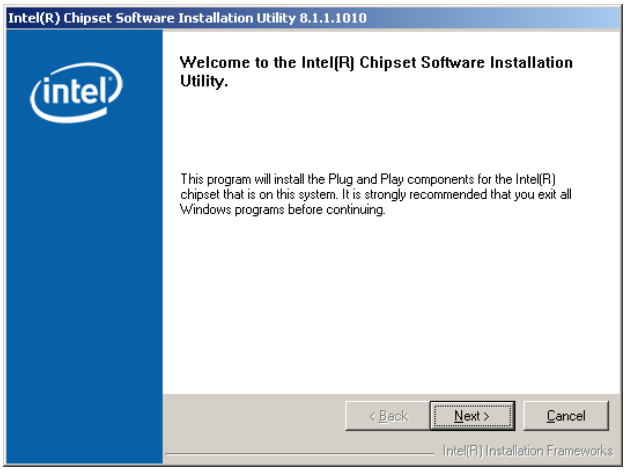

Intel(R) Chipset Software Installation Utility 8.1.1.1010
Welcome to the Intel(R) Chipset Software Installation Utility.
This program will install the Plug and Play components for the Intel(R) chipset that is on this system. It is strongly recommended that you exit all Windows programs before continuing.
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 7-4: Chipset Driver Installation Welcome Screen

Step 5: Click **NEXT** to continue the installation process.

Step 6: The license agreement in **Figure 7-5** appears.

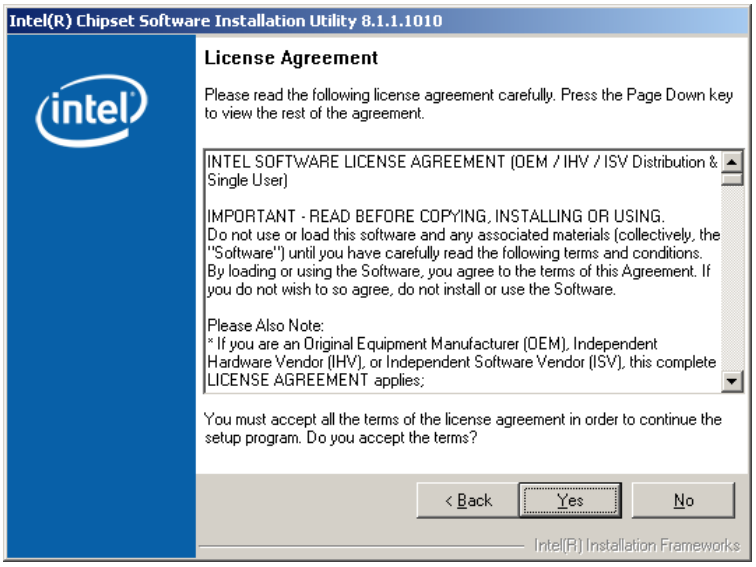

Intel(R) Chipset Software Installation Utility 8.1.1.1010
License Agreement
Please read the following license agreement carefully. Press the Page Down key to view the rest of the agreement.
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
You must accept all the terms of the license agreement in order to continue the setup program. Do you accept the terms?
< Back
Yes
No
Intel(R) Installation Frameworks

Figure 7-5: Chipset Driver Installation License Agreement

Step 7: Read the license agreement. To accept the terms and conditions stipulated in the agreement, click **YES**.

Step 8: The Readme file in **Figure 7-6** appears.

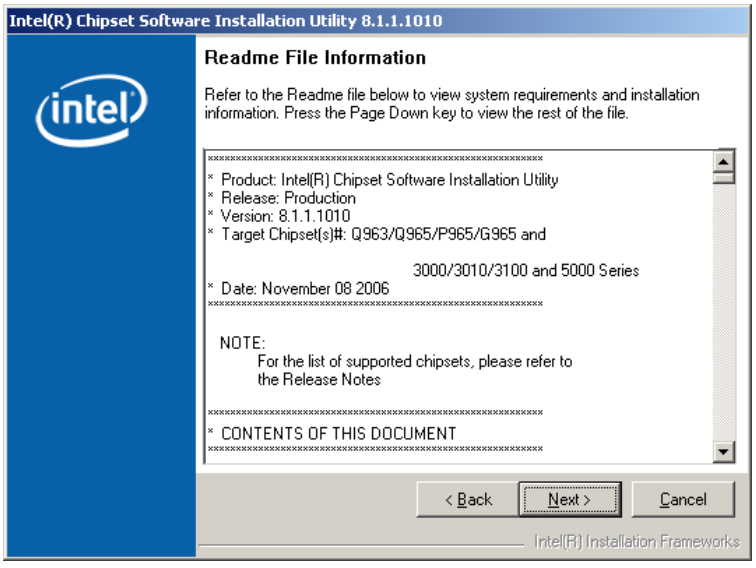

Intel(R) Chipset Software Installation Utility 8.1.1.1010
Readme File Information
Refer to the Readme file below to view system requirements and installation information. Press the Page Down key to view the rest of the file.
* Product: Intel(R) Chipset Software Installation Utility
* Release: Production
* Version: 8.1.1.1010
* Target Chipset(s)#: Q963/Q965/P965/G965 and
3000/3010/3100 and 5000 Series
* Date: November 08 2006
NOTE:
For the list of supported chipsets, please refer to the Release Notes
* CONTENTS OF THIS DOCUMENT
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 7-6: Chipset Driver Readme File Information

Step 9: Read the Readme file information and then click **NEXT** to start the driver

installation.

Step 10: After the driver installation process is complete, a confirmation screen appears (**Figure 7-7**).

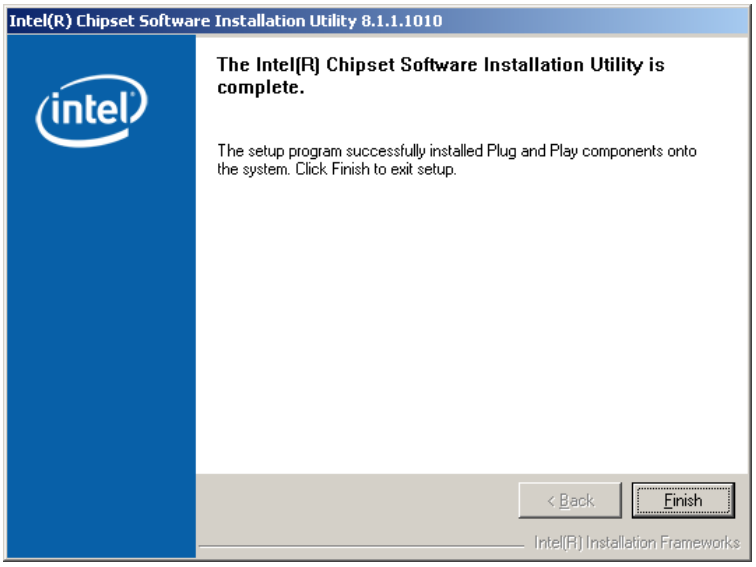

Intel(R) Chipset Software Installation Utility 8.1.1.1010
The Intel(R) Chipset Software Installation Utility is complete.
The setup program successfully installed Plug and Play components onto the system. Click Finish to exit setup.
< Back
Finish
Intel(R) Installation Frameworks

Figure 7-7: Chipset Driver Installation Complete

Step 1: Click **FINISH** to complete the driver installation.

7.4 Intel Graphics Media Accelerator Driver Installation

To install the chipset driver, please follow the steps below.

Step 2: Select the VGA driver from the list in **Figure 7-2**.

Step 3: A new window opens (**Figure 7-8**).

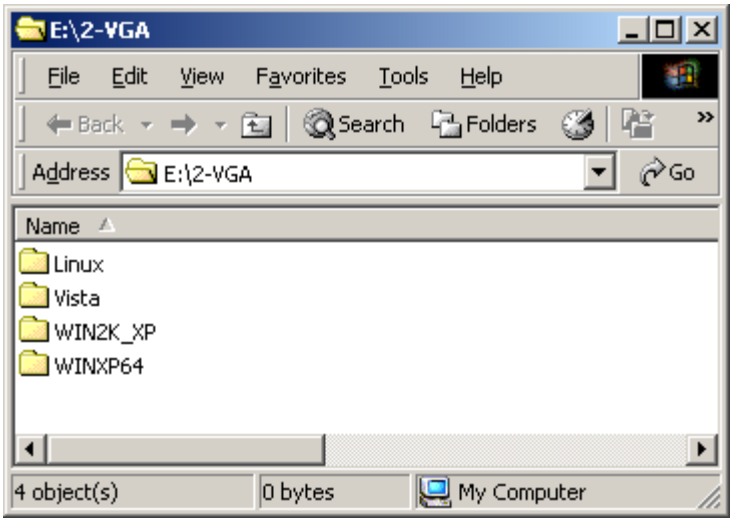


Figure 7-8: Select the Operating System

Step 4: Double-click the appropriate operating system folder.

Step 5: A new window appears (**Figure 7-9**).

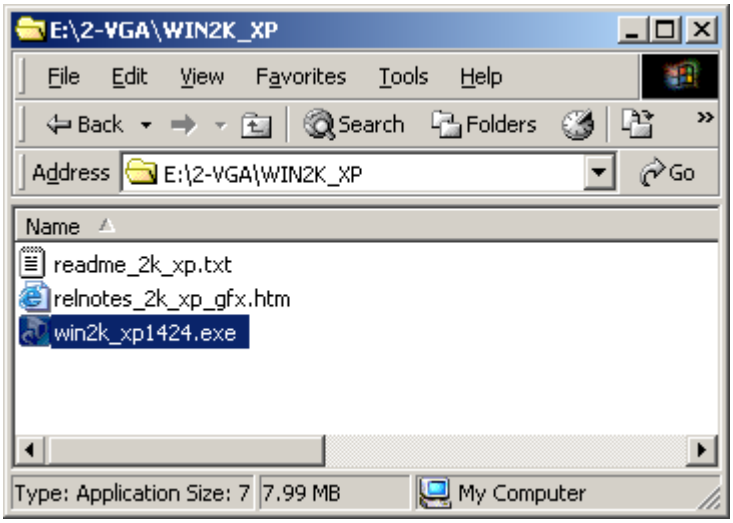


Figure 7-9: VGA Driver

Step 6: Double-click the installation program icon to continue the installation process.

Step 7: The Readme information file shown in **Figure 7-10** appears.

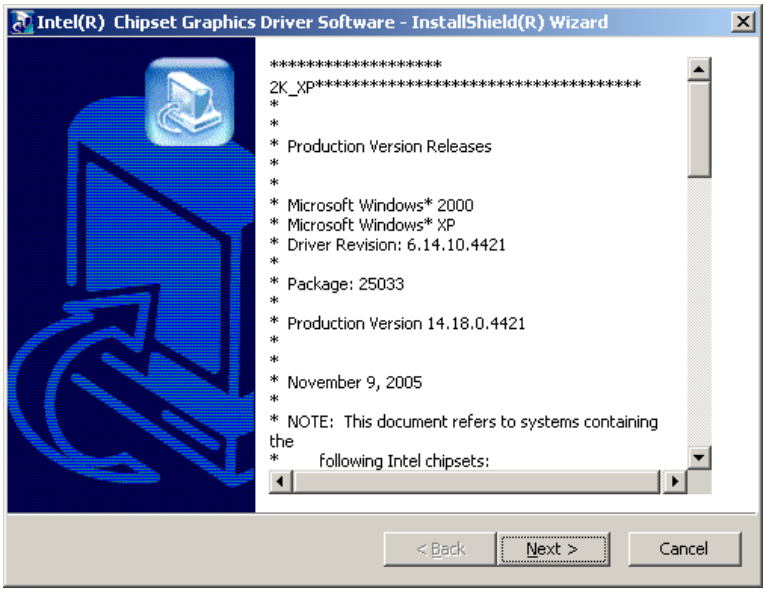


Figure 7-10: Intel® Graphics Media Accelerator InstallShield Wizard

Step 8: Read the Readme file information and click **NEXT** to begin extracting files (**Figure 7-11**).

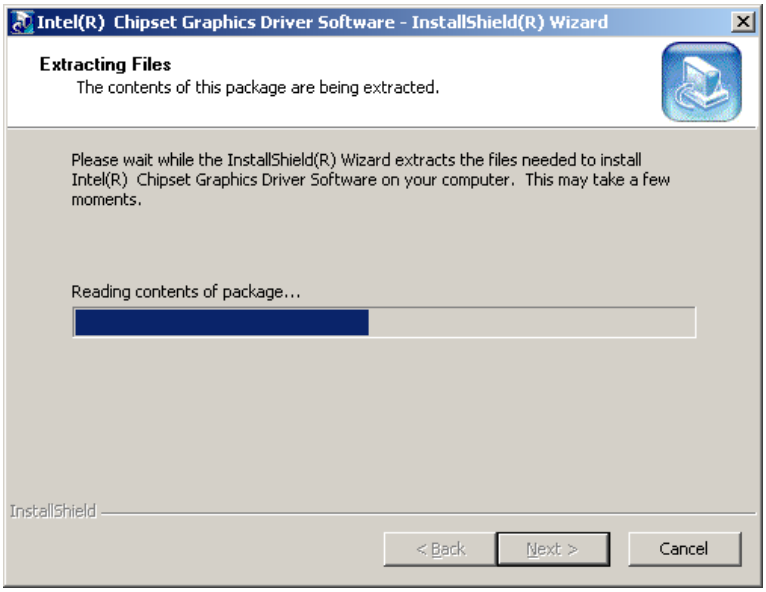

Intel(R) Chipset Graphics Driver Software - InstallShield(R) Wizard
Extracting Files
The contents of this package are being extracted.
Please wait while the InstallShield(R) Wizard extracts the files needed to install Intel(R) Chipset Graphics Driver Software on your computer. This may take a few moments.
Reading contents of package...
InstallShield
< Back
Next >
Cancel

Figure 7-11: InstallShield Wizard Extracting Files

Step 9: The **Graphics Media Accelerator Driver Welcome** screen appears (**Figure 7-12**).

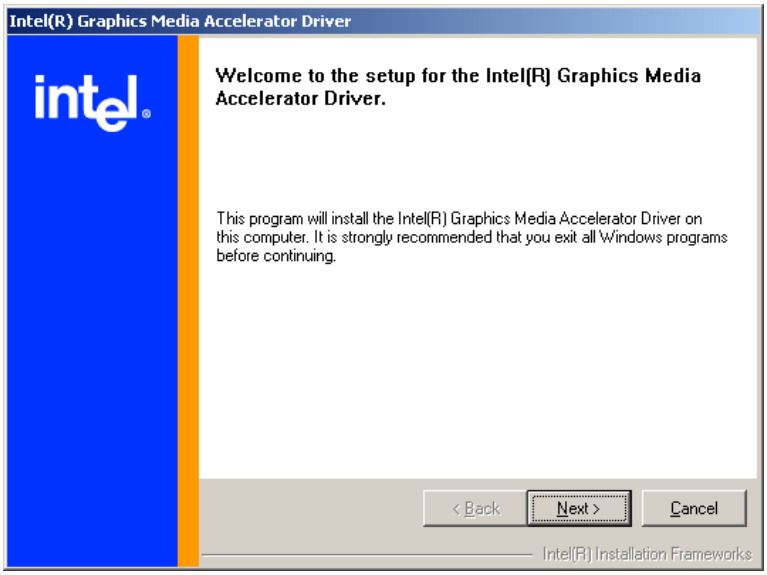

Intel(R) Graphics Media Accelerator Driver
intel
Welcome to the setup for the Intel(R) Graphics Media Accelerator Driver.
This program will install the Intel(R) Graphics Media Accelerator Driver on this computer. It is strongly recommended that you exit all Windows programs before continuing.
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 7-12: Intel® Graphics Media Accelerator Driver Welcome Screen

Step 10: Click **NEXT** and a license agreement appears (**Figure 7-13**).

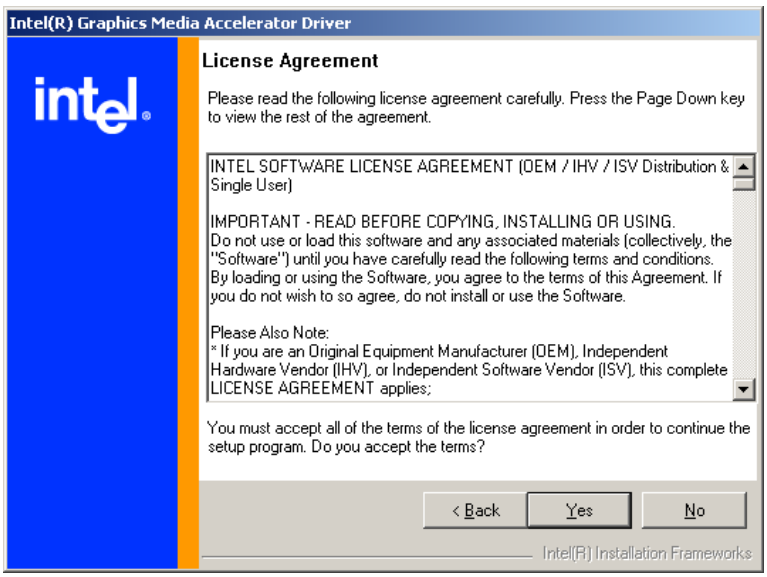

Intel(R) Graphics Media Accelerator Driver
intel
License Agreement
Please read the following license agreement carefully. Press the Page Down key to view the rest of the agreement.
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
< Back
Yes
No
Intel(R) Installation Frameworks

Figure 7-13: Intel® Graphics Media Accelerator Driver License Agreement

Step 11: Read the license agreement. To accept the terms and conditions stipulated in the license agreement shown, click **YES** and the installation notice appears (**Figure 7-14**) as the driver is installed.

Figure 7-14: Intel® Graphics Media Accelerator Driver Installing Notice

Step 12: After the driver installation process is complete, a confirmation screen appears (**Figure 7-15**).

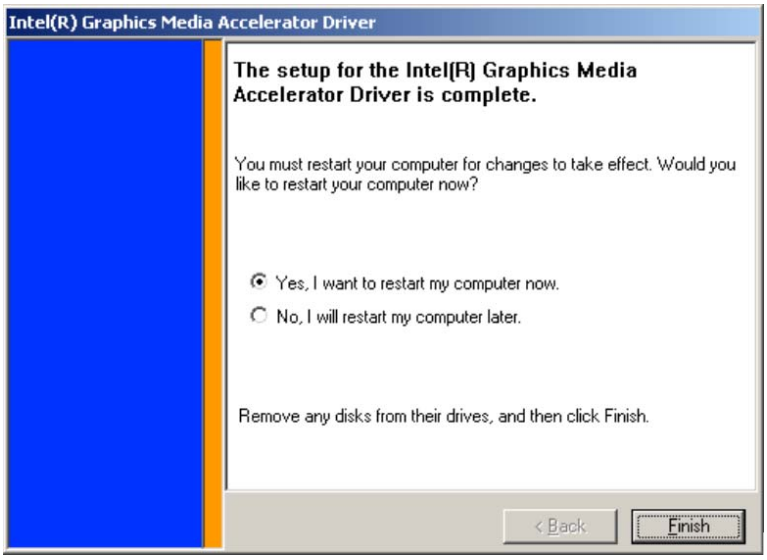

Intel(R) Graphics Media Accelerator Driver
The setup for the Intel(R) Graphics Media Accelerator Driver is complete.
You must restart your computer for changes to take effect. Would you like to restart your computer now?
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish.
< Back
Finish

Figure 7-15: Intel® Graphics Media Accelerator Installation Complete

Step 13: The confirmation screen offers the option of restarting the computer now or later. For the settings to take effect, the computer must be restarted. Click **FINISH** to restart the computer.

7.5 Broadcom LAN Driver (for GbE LAN) Installation

To install the Broadcom LAN driver, please follow the steps below.

Step 1: Open **Windows Control Panel (Figure 7-16**).

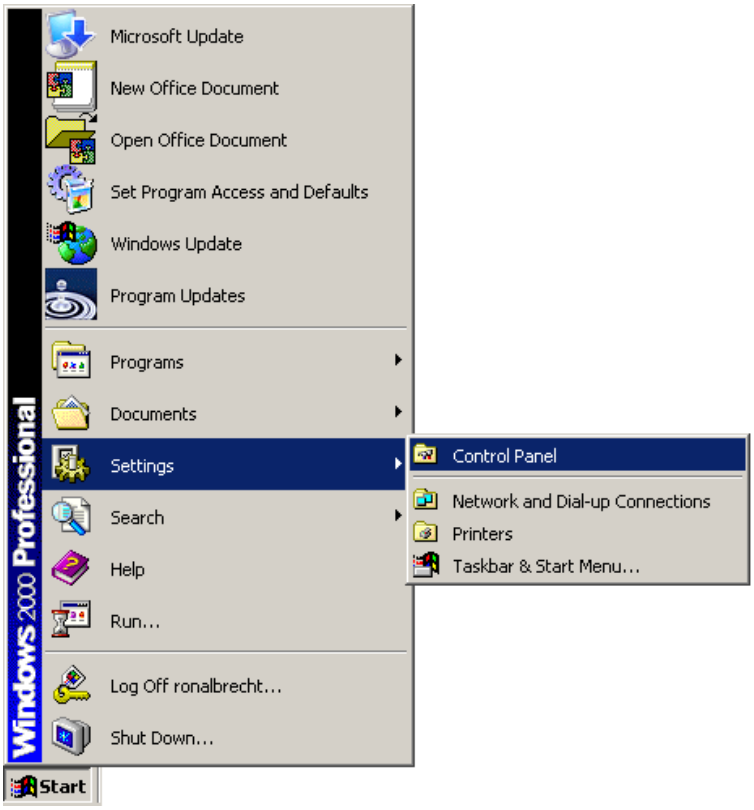


Figure 7-16: Windows Control Panel

Step 2: Double-click the **System** icon.

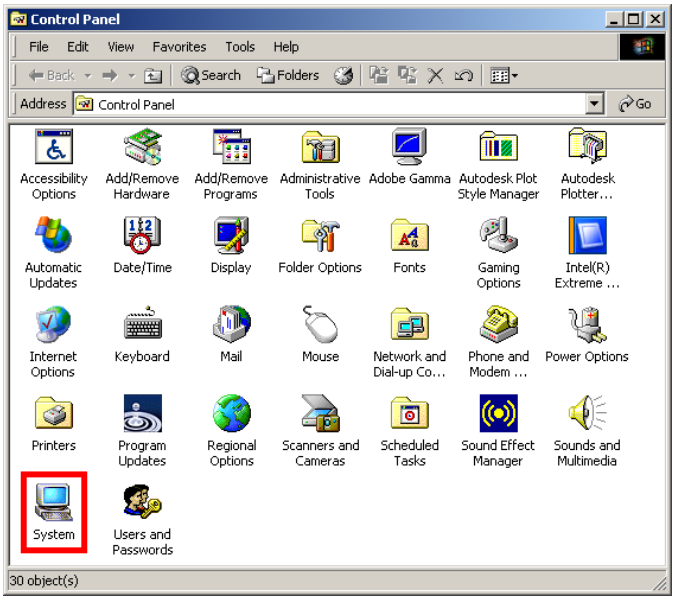


Figure 7-17: System Icon

Step 3: Click the **Device Manager** tab (**Figure 7-18**).

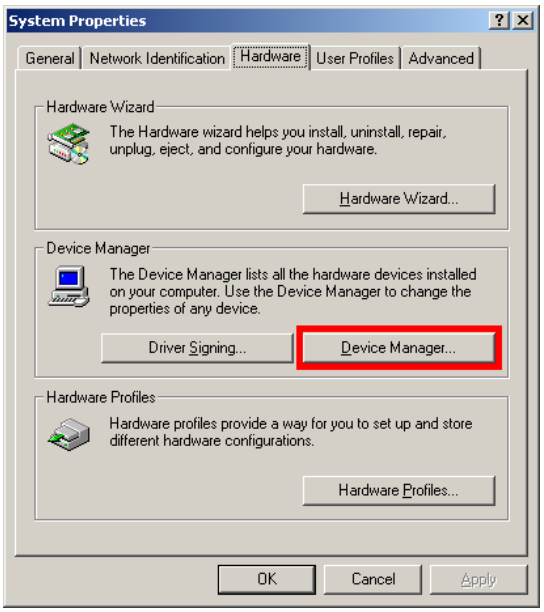

System Properties
General
Network Identification
Hardware
User Profiles
Advanced
Hardware Wizard
The Hardware wizard helps you install, uninstall, repair, unplug, eject, and configure your hardware.
Hardware Wizard...
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Driver Signing...
Device Manager...
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles...
OK
Cancel
Apply

Figure 7-18: Device Manager Tab

Step 4: A list of system hardware devices appears (**Figure 7-19**).

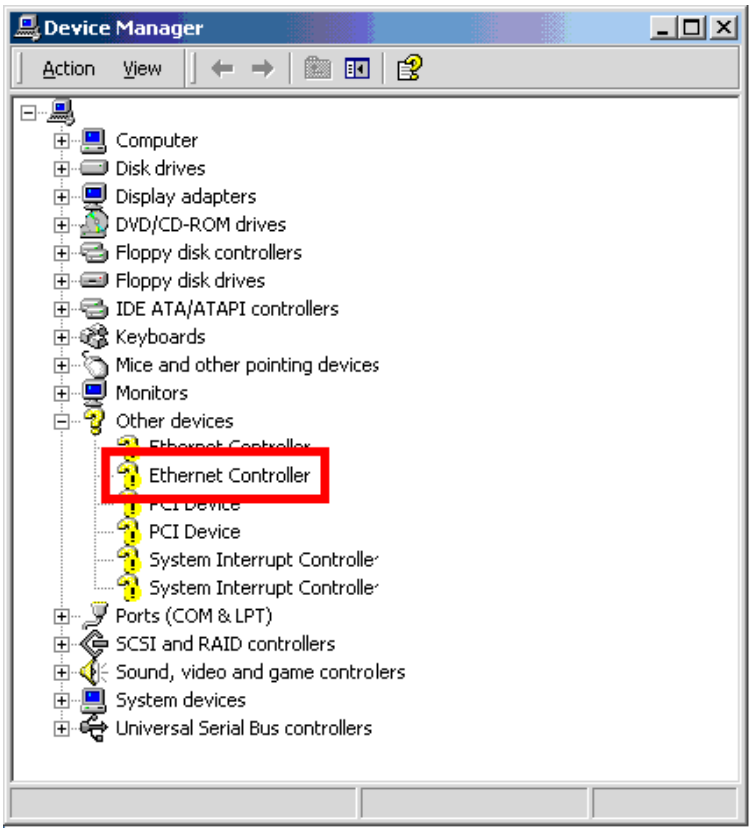


Figure 7-19: Device Manager List

Step 5: Double-click the listed device that has question marks next to it (this means Windows does not recognize the device).

Step 6: The **Device Driver Wizard** appears (**Figure 7-20**).

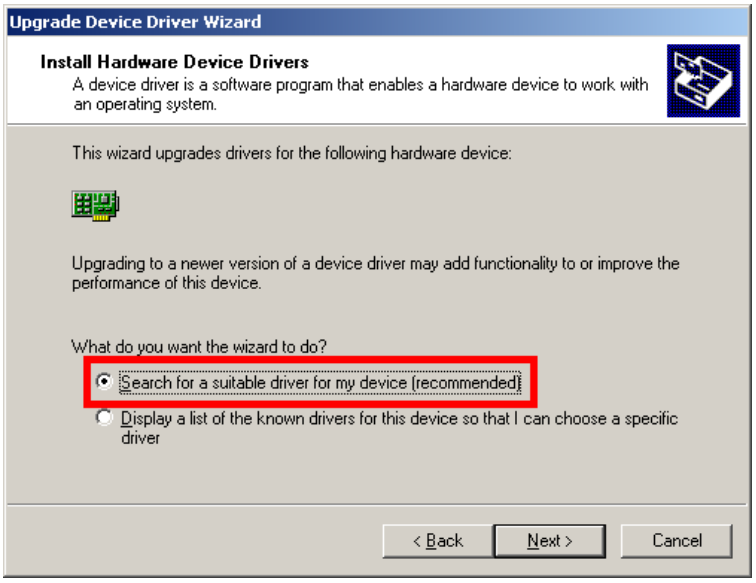

Upgrade Device Driver Wizard
Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.
This wizard upgrades drivers for the following hardware device:
Upgrading to a newer version of a device driver may add functionality to or improve the performance of this device.
What do you want the wizard to do?
Search for a suitable driver for my device (recommended)
Display a list of the known drivers for this device so that I can choose a specific driver
< Back
Next >
Cancel

Figure 7-20: Search for Suitable Driver

Step 7: Select "**Search for a suitable driver for my device (recommended)**," and click **NEXT** to continue.

Step 8: Select "**Specify a Location**" in the **Locate Driver Files** window (Figure 7-22).

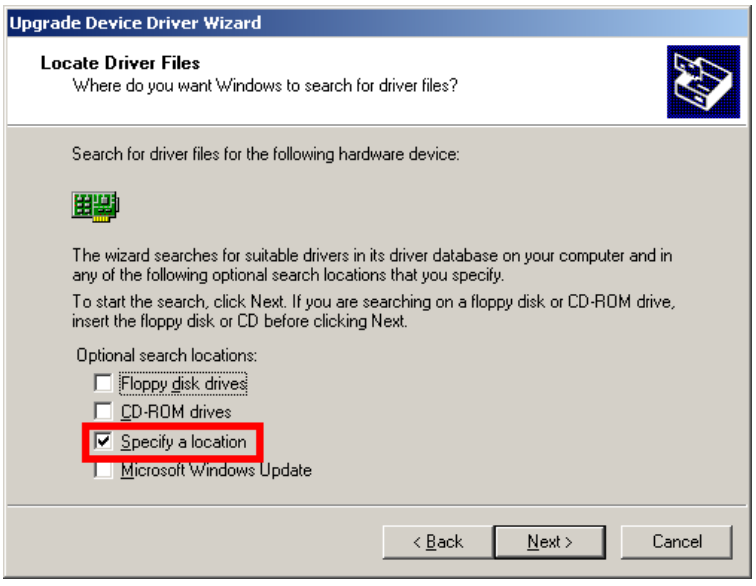

Upgrade Device Driver Wizard
Locate Driver Files
Where do you want Windows to search for driver files?
Search for driver files for the following hardware device:
The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
Optional search locations:
Floppy disk drives
CD-ROM drives
Specify a location
Microsoft Windows Update
< Back
Next >
Cancel

Figure 7-21: Locate Driver Files

Step 9: Click **NEXT** to continue.

Step 10: The **Locate File** window appears (Figure 7-22).

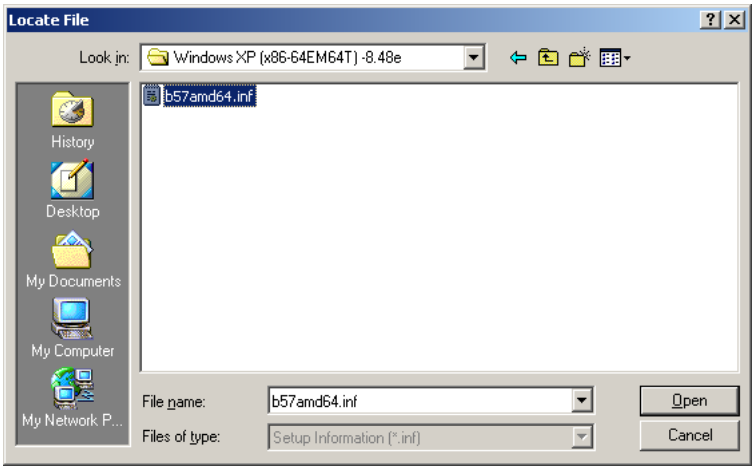


Figure 7-22: Location Browsing Window

Step 11: Select the proper OS folder under the "**X:\3-LAN\BROADCOM BCM5787M Drivers**" directory in the **Locate File** window, where "**X:\"** is the system CD drive.

Step 12: Click **OPEN** and the driver is installed.

7.6 Realtek HD Audio Driver (ALC883) Installation

To install the Realtek High Definition (HD) Audio driver, please follow the steps below.

7.6.1 BIOS Setup

Step 1: Enter the BIOS setup. To do this, reboot the system and press **DEL** during POST.

Step 2: Go to the Southbridge Configuration menu. Set the **Audio Controller** option to [Azalia].

Step 3: Press **F10** to save the changes and exit the BIOS setup. The system reboots.

7.6.2 Driver Installation

To install the audio driver please follow the steps below.

Step 1: Select **AUDIO** from the list in **Figure 7-2**.

Step 2: A new window opens (**Figure 7-23**).

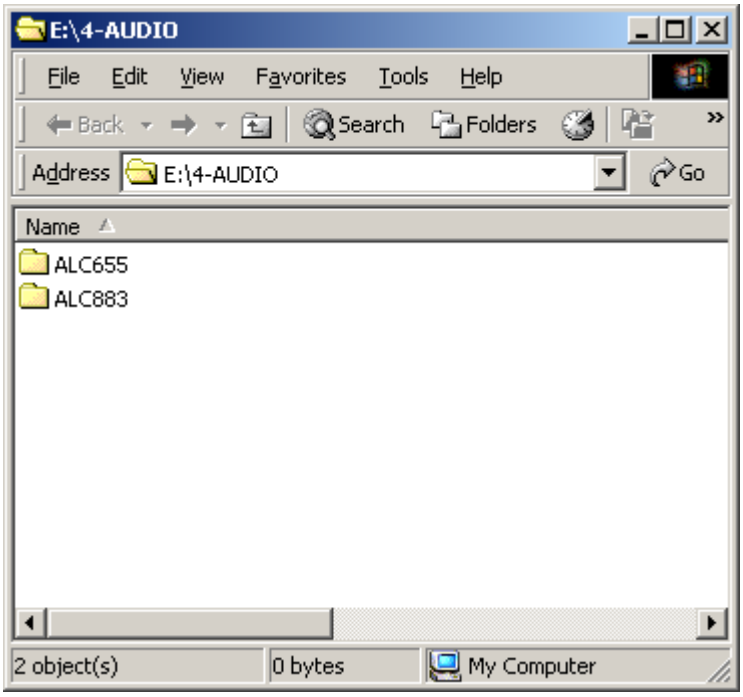


Figure 7-23: Select the Audio CODEC

Step 3: Double-click the ALC883 folder.

Step 4: Double-click the appropriate operating system folder (**Figure 7-24**).

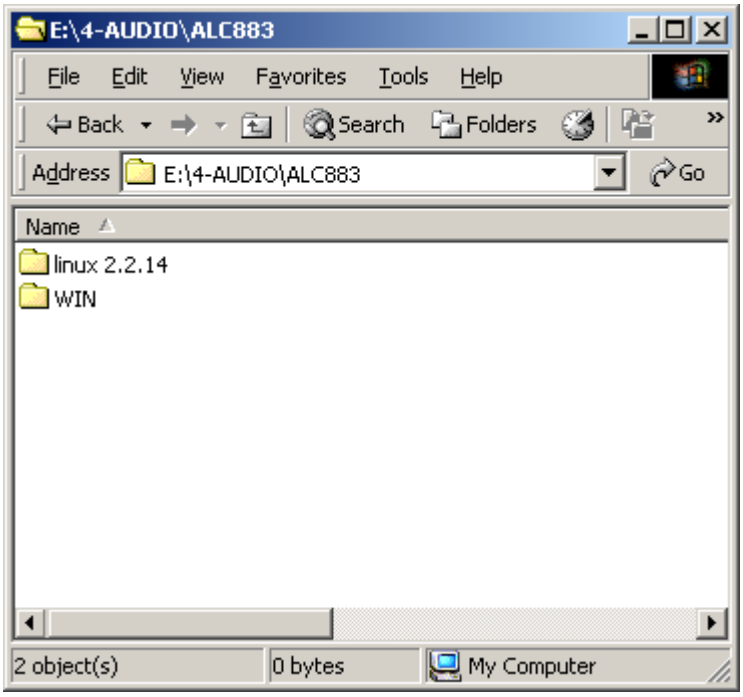


Figure 7-24: Select the OS

Step 5: Double-click the appropriate operating system version folder (**Figure 7-25**).

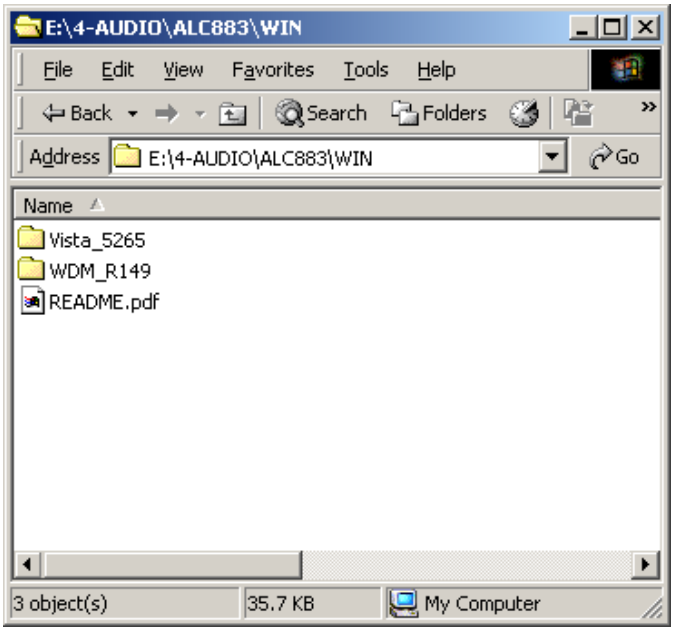


Figure 7-25: Select the OS Version

Step 6: Double-click the **Setup.exe** program icon in **Figure 7-26**.

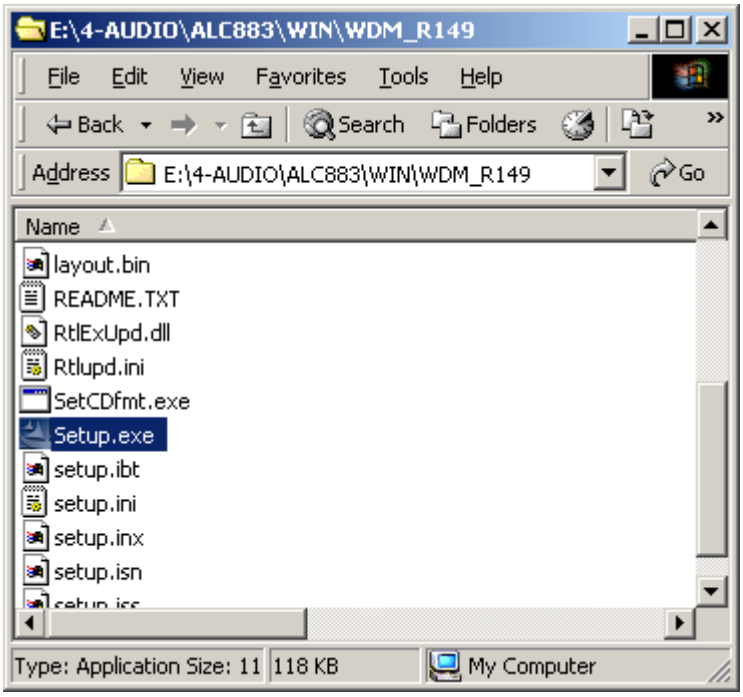


Figure 7-26: Locate the Setup Program Icon

Step 7: The **InstallShield Wizard** starts (**Figure 7-27**).

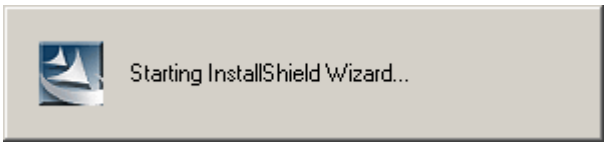


Figure 7-27: The InstallShield Wizard Starts

Step 8: The **InstallShield Wizard** is prepared to guide the user through the rest of the process (**Figure 7-28**).

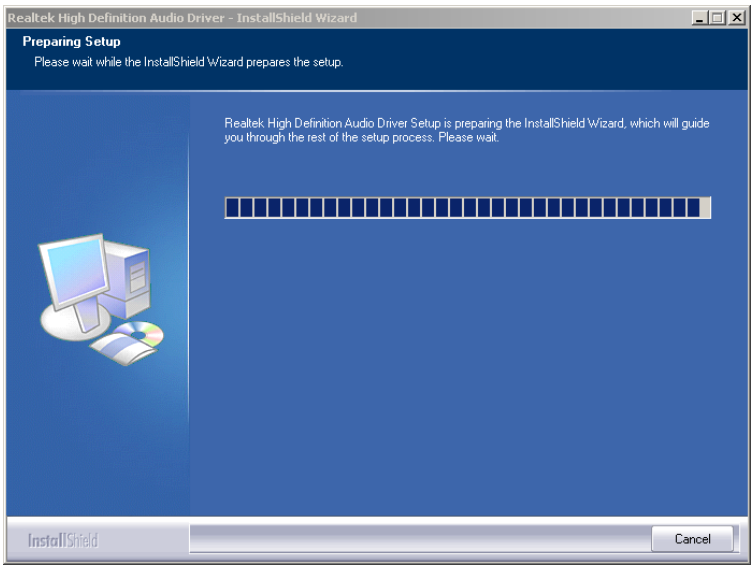

Realtek High Definition Audio Driver - InstallShield Wizard
Preparing Setup
Please wait while the InstallShield Wizard prepares the setup.
Realtek High Definition Audio Driver Setup is preparing the InstallShield Wizard, which will guide you through the rest of the setup process. Please wait.
InstallShield
Cancel

Figure 7-28: Preparing Setup Screen

Step 9: Once initialized, the **InstallShield Wizard** welcome screen appears (**Figure 7-29**).

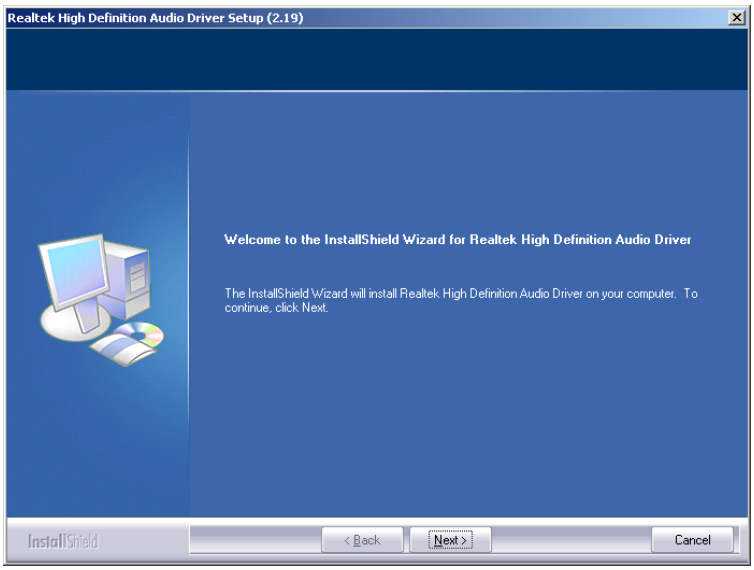

Realtek High Definition Audio Driver Setup (2.19)
Welcome to the InstallShield Wizard for Realtek High Definition Audio Driver
The InstallShield Wizard will install Realtek High Definition Audio Driver on your computer. To continue, click Next.
InstallShield
< Back
Next >
Cancel

Figure 7-29: InstallShield Wizard Welcome Screen

Step 10: Click **NEXT** to continue the installation.

Step 11: InstallShield starts to install the new software as shown in **Figure 7-30**.

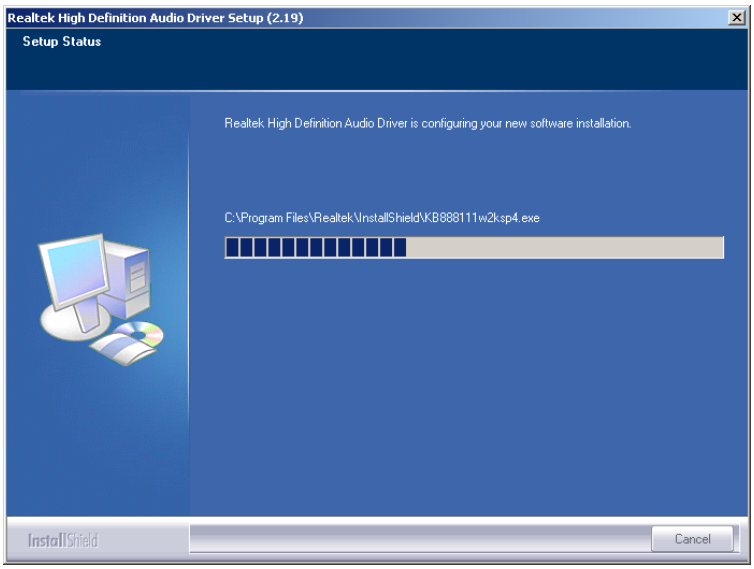

Realtek High Definition Audio Driver Setup (2.19)
Setup Status
Realtek High Definition Audio Driver is configuring your new software installation.
C:\Program Files\Realtek\InstallShield\KB888111w2ksp4.exe
InstallShield
Cancel

Figure 7-30: Audio Driver Software Configuration

Step 12: The Installation Wizard updates the system as shown in **Figure 7-31**.

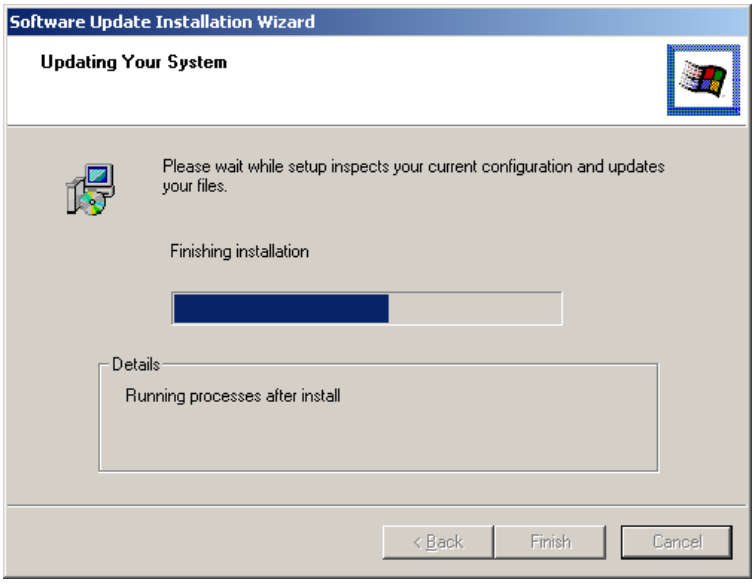


Figure 7-31: Installation Wizard Updates the System

Step 13: After the driver installation process is complete, a confirmation screen appears (**Figure 7-32**).

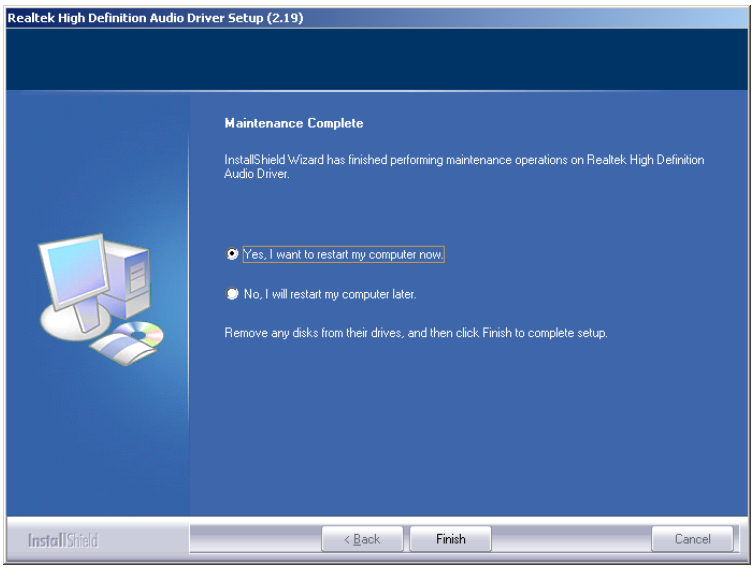

Realtek High Definition Audio Driver Setup (2.19)
Maintenance Complete
InstallShield Wizard has finished performing maintenance operations on Realtek High Definition Audio Driver.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
InstallShield
< Back
Finish
Cancel

Figure 7-32: Restart the Computer

Step 14: The confirmation screen offers the option of restarting the computer now or later. For the settings to take effect, the computer must be restarted. Click **FINISH** to restart the computer.

7.7 SATA RAID Driver Installation

To install the Intel® Matrix Storage Manager driver, please follow the steps below:

Step 1: Select **SATA** from the list in **Figure 7-2**.

Step 2: A new window opens (**Figure 7-33**).

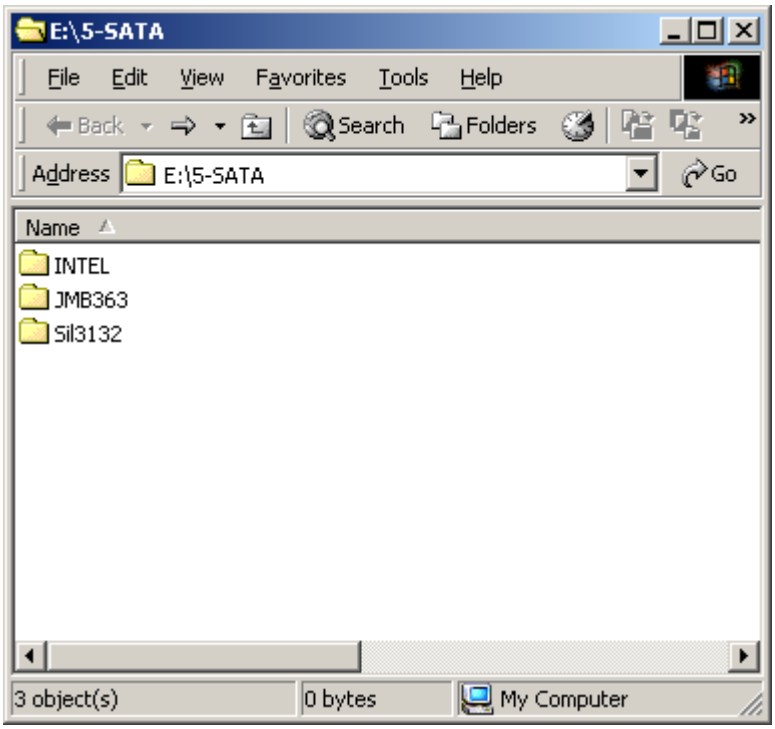


Figure 7-33: SATA RAID Driver Installation Program

Step 3: Double-click the **INTEL** folder.

Step 4: Double-click the **iata62_cd.exe** program icon in **Figure 7-34**.

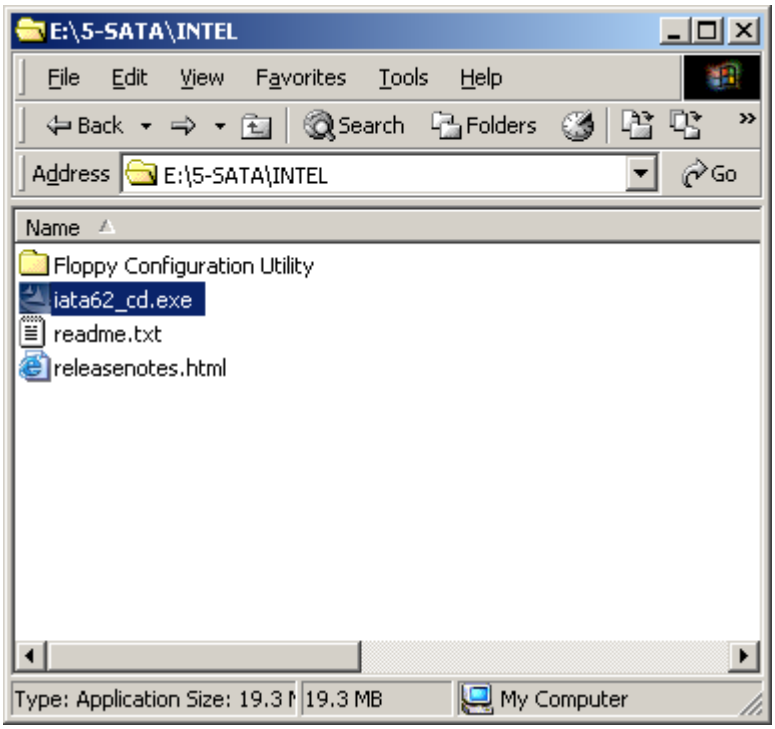


Figure 7-34: SATA RAID Setup Program Icon

Step 5: **Figure 7-35** shows the **InstallShield Wizard** preparing to guide the user through the rest of the process.

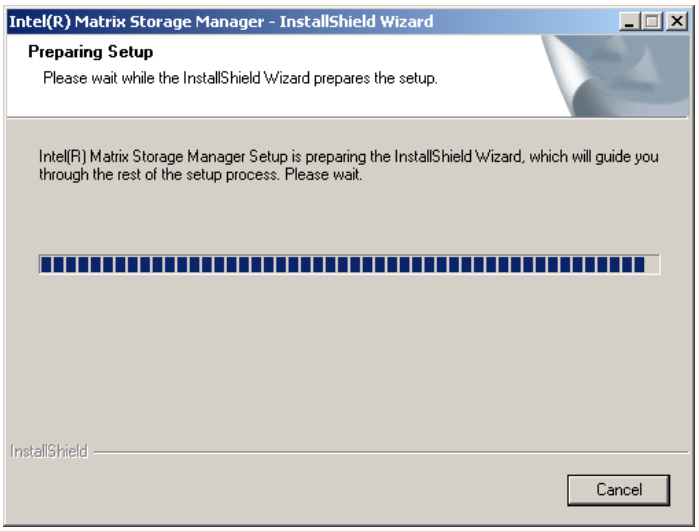

Intel(R) Matrix Storage Manager - InstallShield Wizard
Preparing Setup
Please wait while the InstallShield Wizard prepares the setup.
Intel(R) Matrix Storage Manager Setup is preparing the InstallShield Wizard, which will guide you through the rest of the setup process. Please wait.
InstallShield
Cancel

Figure 7-35: InstallShield Wizard Setup Screen

Step 6: **Figure 7-36** shows the **Matrix Storage Manager** software configuring the installation process.

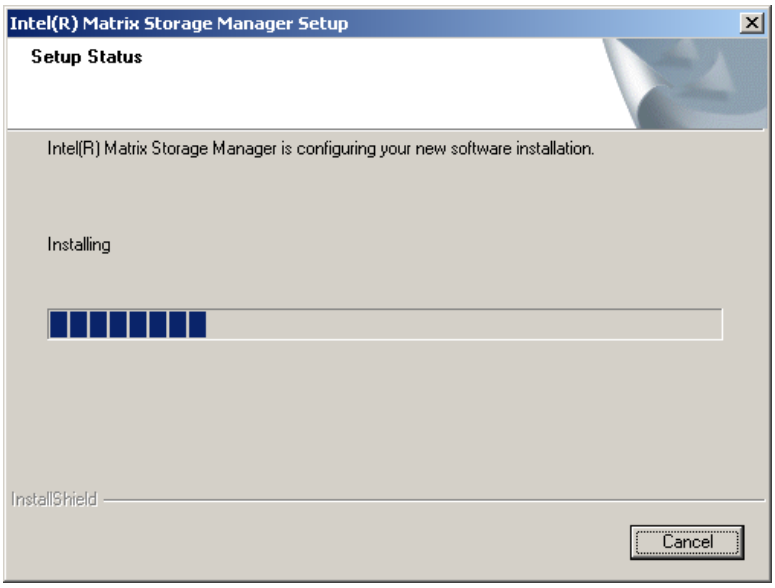


Figure 7-36: Matrix Storage Manager Setup Screen

Step 7: **Figure 7-37** shows the **Matrix Storage Manager** welcome screen.

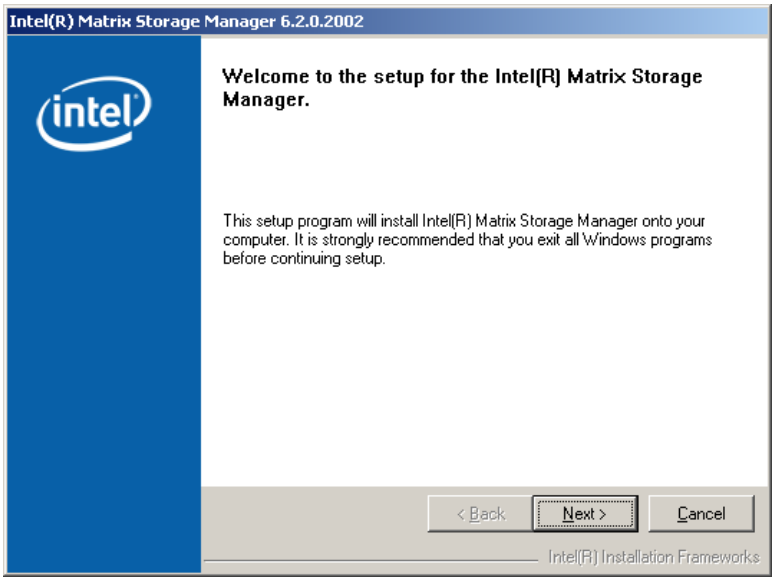

Intel(R) Matrix Storage Manager 6.2.0.2002
Welcome to the setup for the Intel(R) Matrix Storage Manager.
This setup program will install Intel(R) Matrix Storage Manager onto your computer. It is strongly recommended that you exit all Windows programs before continuing setup.
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 7-37: Matrix Storage Manager Welcome Screen

Step 8: Click **NEXT** and a warning appears (**Figure 7-38**). Read the warning carefully and decide whether or not to continue the installation process.

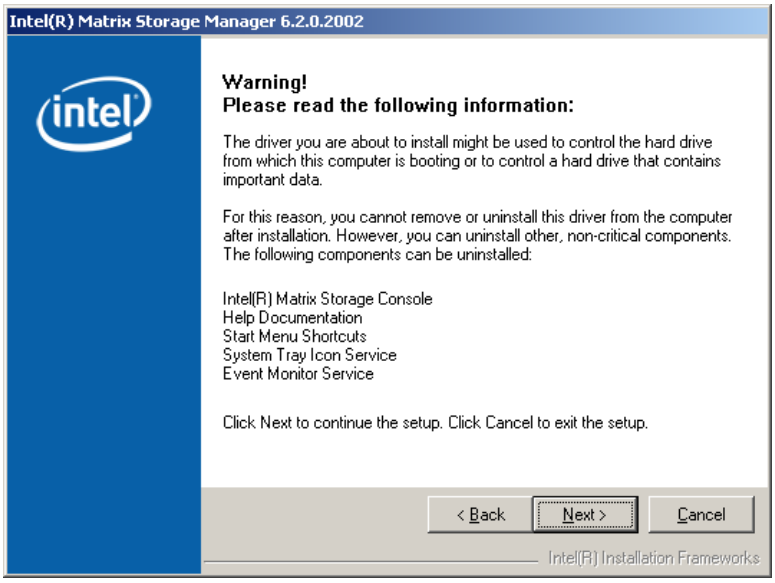

Intel(R) Matrix Storage Manager 6.2.0.2002
Warning!
Please read the following information:
The driver you are about to install might be used to control the hard drive from which this computer is booting or to control a hard drive that contains important data.
For this reason, you cannot remove or uninstall this driver from the computer after installation. However, you can uninstall other, non-critical components. The following components can be uninstalled:
Intel(R) Matrix Storage Console
Help Documentation
Start Menu Shortcuts
System Tray Icon Service
Event Monitor Service
Click Next to continue the setup. Click Cancel to exit the setup.
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 7-38: Matrix Storage Manager Warning Screen

Step 9: Click **NEXT** and a license agreement appears (**Figure 7-39**).

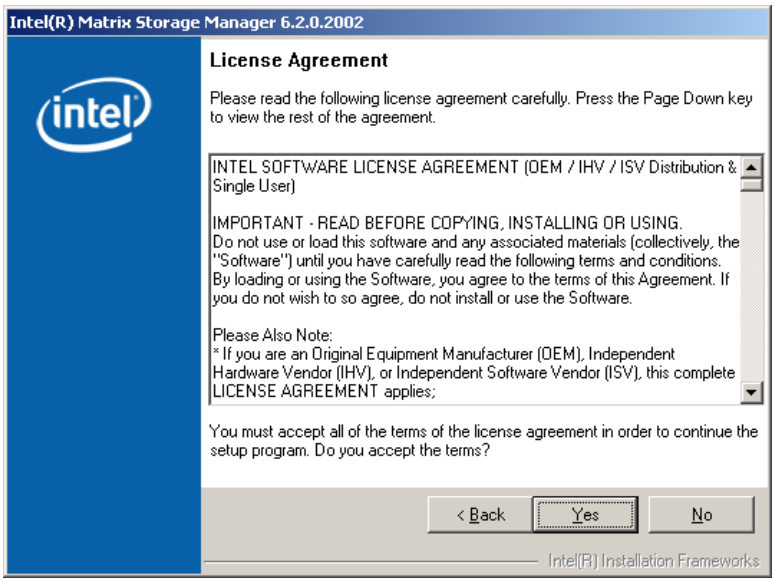

Intel(R) Matrix Storage Manager 6.2.0.2002
License Agreement
Please read the following license agreement carefully. Press the Page Down key to view the rest of the agreement.
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
< Back
Yes
No
Intel(R) Installation Frameworks

Figure 7-39: Matrix Storage Manager License Agreement

Step 10: Read the license agreement. To accept the terms and conditions stipulated in the license agreement shown, click **YES** and the Readme information file shown in **Figure 7-40** appears.

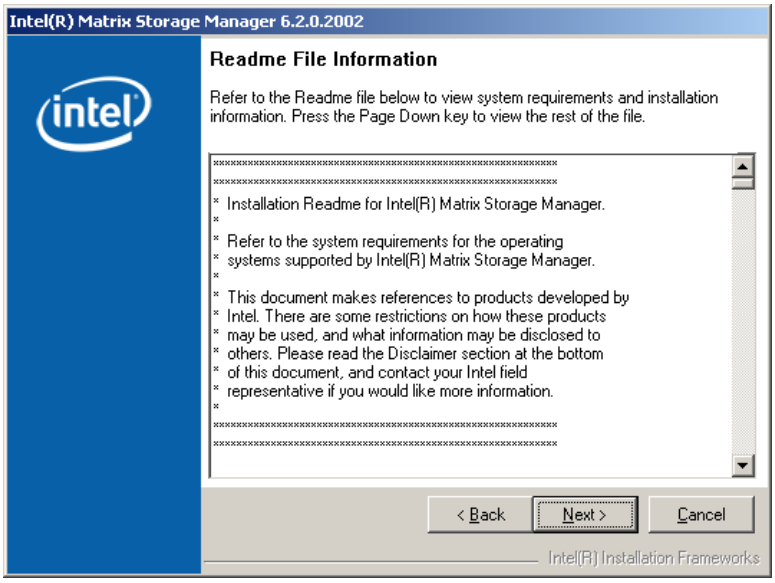

Intel(R) Matrix Storage Manager 6.2.0.2002
Readme File Information
Refer to the Readme file below to view system requirements and installation information. Press the Page Down key to view the rest of the file.
* Installation Readme for Intel(R) Matrix Storage Manager.
* Refer to the system requirements for the operating
* systems supported by Intel(R) Matrix Storage Manager.
* This document makes references to products developed by
* Intel. There are some restrictions on how these products
* may be used, and what information may be disclosed to
* others. Please read the Disclaimer section at the bottom
* of this document, and contact your Intel field
* representative if you would like more information.
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 7-40: Matrix Storage Manager Readme File

Step 11: Read the Readme file information and click **NEXT**.

Step 12: After the driver installation process is complete, a confirmation screen appears (**Figure 7-41**).

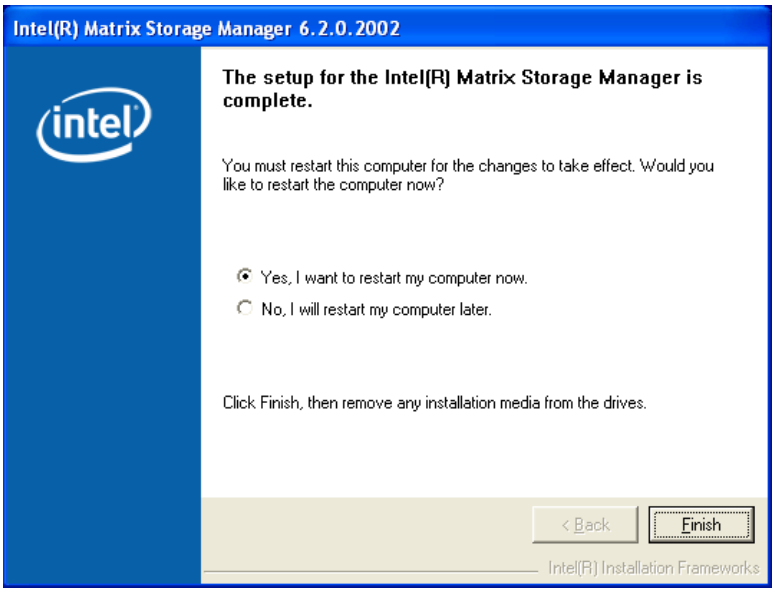

Intel(R) Matrix Storage Manager 6.2.0.2002
The setup for the Intel(R) Matrix Storage Manager is complete.
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart my computer now.
No, I will restart my computer later.
Click Finish, then remove any installation media from the drives.
< Back
Finish
Intel(R) Installation Frameworks

Figure 7-41: Matrix Storage Manager Setup Complete

Step 13: The confirmation screen offers the option of restarting the computer now or later.

For the settings to take effect, the computer must be restarted. Click **FINISH** to restart the computer.

7.8 IDE Controller Installation

To install the IDE controller, please follow the steps below.

Step 1: Open **Windows Control Panel** (**Figure 7-42**).

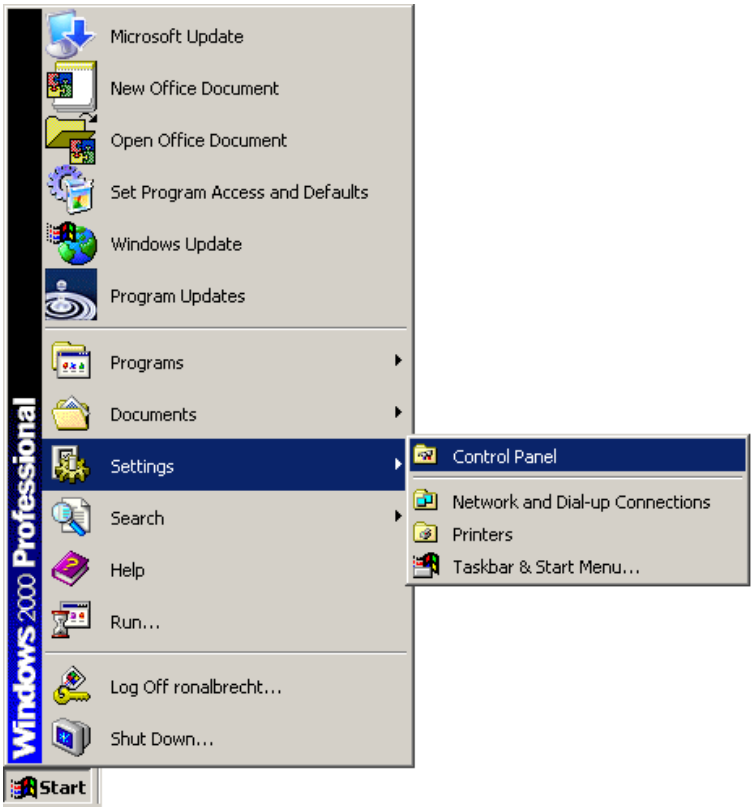


Figure 7-42: Access Windows Control Panel

Step 2: Double-click the **System** icon (**Figure 7-43**).

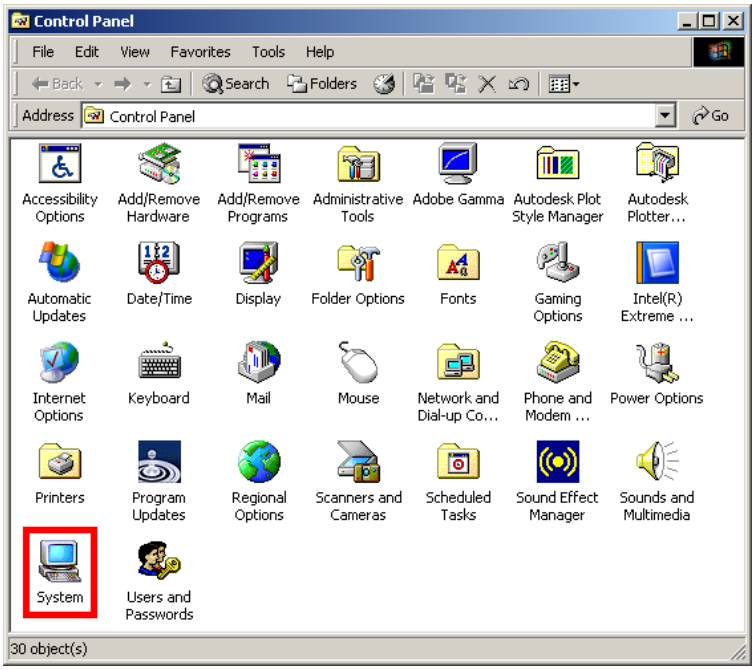


Figure 7-43: Double Click the System Icon

Step 3: Click the **Device Manager** tab (**Figure 7-44**).

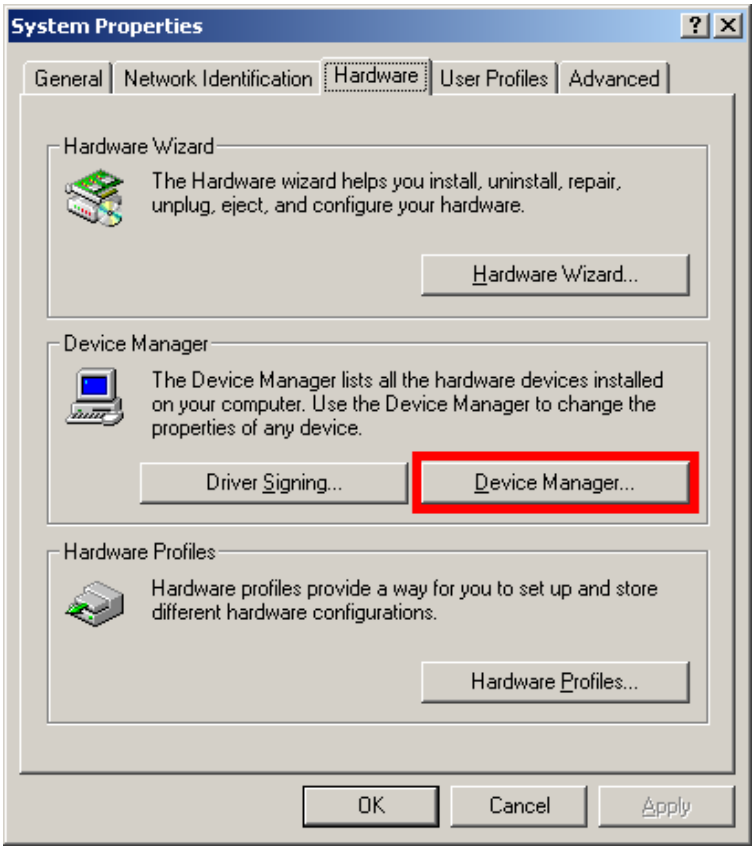

System Properties
General
Network Identification
Hardware
User Profiles
Advanced
Hardware Wizard
The Hardware wizard helps you install, uninstall, repair, unplug, eject, and configure your hardware.
Hardware Wizard...
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Driver Signing...
Device Manager...
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles...
OK
Cancel
Apply

Figure 7-44: Double Click the Device Manager Tab

Step 4: A list of system hardware devices appears (**Figure 7-45**).

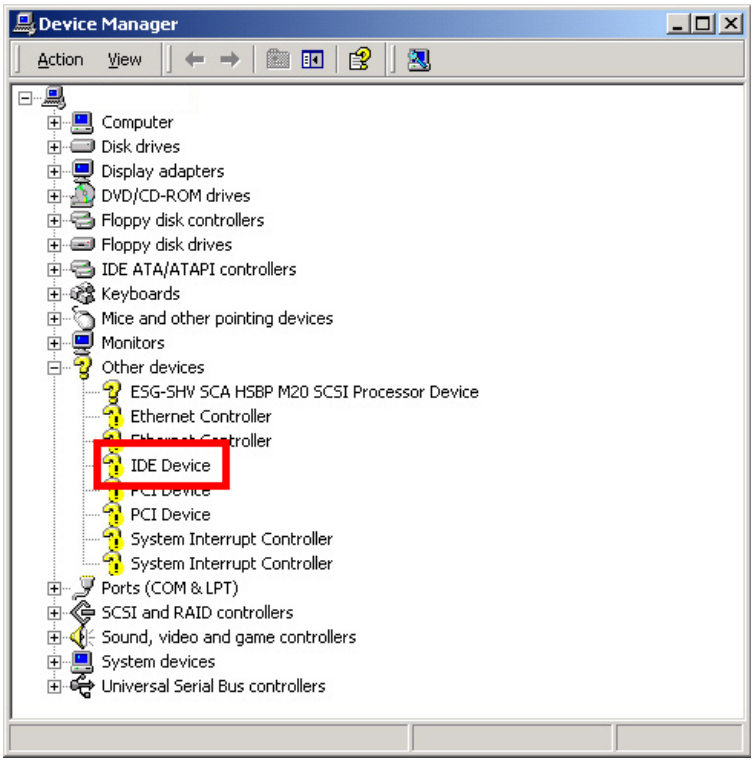


Figure 7-45: Device Manager List

Step 5: Double-click the listed device that has question marks next to it (This means Windows does not recognize the device).

Step 6: The **Device Driver Wizard** appears (**Figure 7-46**).

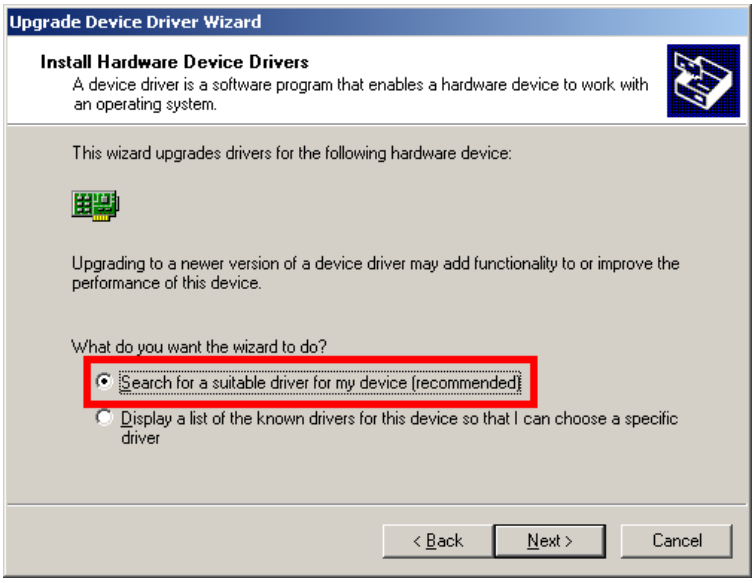

Upgrade Device Driver Wizard
Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.
This wizard upgrades drivers for the following hardware device:
Upgrading to a newer version of a device driver may add functionality to or improve the performance of this device.
What do you want the wizard to do?
Search for a suitable driver for my device (recommended)
Display a list of the known drivers for this device so that I can choose a specific driver
< Back
Next >
Cancel

Figure 7-46: Search for Suitable Driver

Step 7: Select "**Search for a suitable driver for my device (recommended)**," and click **NEXT** to continue.

Step 8: The **Locate Driver Files** window (**Figure 7-47**) appears.

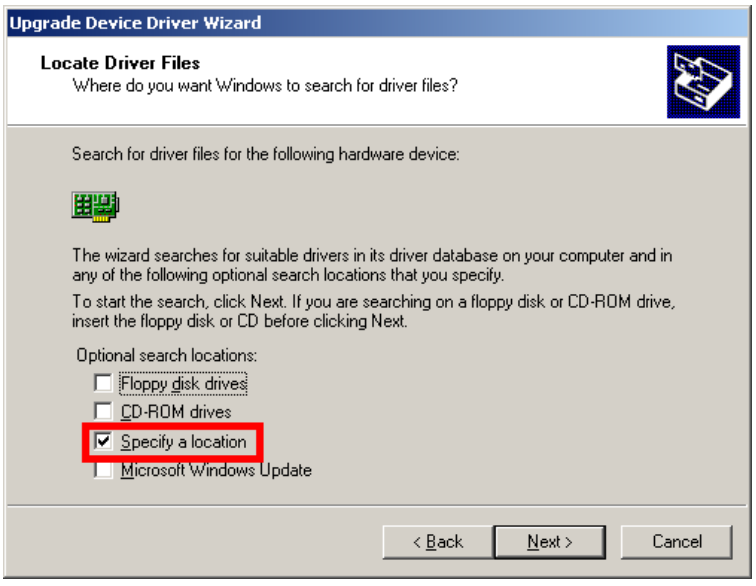

Upgrade Device Driver Wizard
Locate Driver Files
Where do you want Windows to search for driver files?
Search for driver files for the following hardware device:
The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
Optional search locations:
Floppy disk drives
CD-ROM drives
Specify a location
Microsoft Windows Update
< Back
Next >
Cancel

Figure 7-47: Locate Driver Files

Step 9: Select "**Specify a Location**" and click **NEXT** to continue.

Step 10: Select the proper OS folder under the "**X:\7-IDE\IT8211 v1.3.2.8**" directory

(**Figure 7-48**) in the location browsing window, where "**X:\"** is the system CD drive.

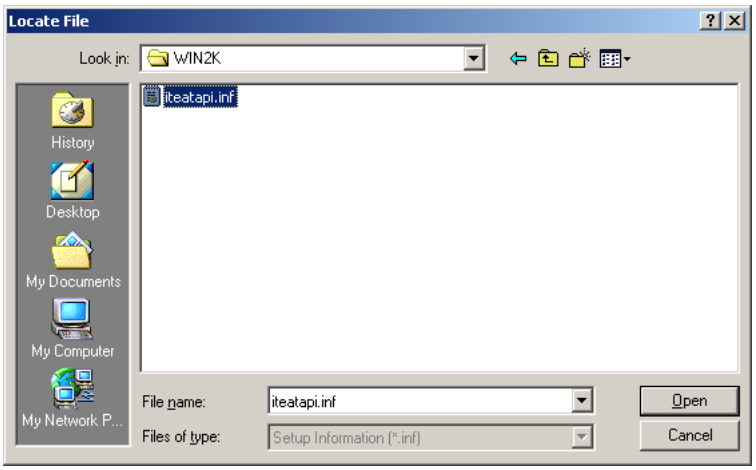


Figure 7-48: Location Browsing Window

Step 11: Select the **iteatapi.inf** file, click **OPEN** and the driver is installed.

Appendix

A

BIOS Configuration Options

A.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in **Chapter 6**.

System Overview **84**
System Time [xx:xx:xx] **85**
System Date [xx/xx/xx] **85**
SATA#1 Compatible **88**
Configure SATA#1 as [IDE] **88**
IDE Master and IDE Slave **89**
Auto-Detected Drive Parameters **90**
Type [Auto] **91**
ZIP **91**
LS-120 ..... **91**
LBA/Large Mode [Auto] **92**
Block (Multi Sector Transfer) [Auto] **92**
PIO Mode [Auto] **92**
DMA Mode [Auto] **93**
S.M.A.R.T [Auto] **94**
32Bit Data Transfer [Enabled] **94**
Serial Port1 Address [3F8/IRQ4] **95**
Serial Port2 Address [2F8/IRQ3] **96**
Serial Port2 Mode [Normal] **96**
Serial Port3 Address [3E8] **96**
Serial Port3 IRQ [11] **97**
Serial Port4 Address [2E8] **97**
Serial Port4 IRQ [10] **97**
AHCI Port n [Not Detected] **100**
Power Button Mode [On/Off] **100**
Resume on Ring [Disabled] **101**
Resume on PME# [Disabled] **101**
Resume On RTC Alarm [Disabled] **101**

RTC Alarm Date (Days) 102
System Time 102
Restore on AC Power Loss [Power Off] 102
Remote Access [Disabled] 103
Serial Port Number 103
Serial Port Mode 103
Redirection after BIOS POST 103
Terminal Type 103
Serial Port Number [COM1] 104
Base Address, IRQ [3F8h,4] 104
Serial Port Mode [115200 8,n,1] 104
Redirection After BIOS POST [Always] 105
Terminal Type [ANSI] 105
USB Functions [Enabled] 106
USB 2.0 Controller [Enabled] 106
Legacy USB Support [Enabled] 107
USB2.0 Controller Mode [HiSpeed] 107
IRQ# [Available] 108
DMA Channel# [Available] 109
Reserved Memory Size [Disabled] 109
Quick Boot [Enabled] 111
Quiet Boot [Disabled] 111
AddOn ROM Display Mode [Force BIOS] 112
Bootup Num-Lock [On] 112
Enable PATA ROM [Enabled] disabled 112
Boot From LAN Support [Disabled] 113
Change Supervisor Password 114
Change User Password 114
Memory Remap Feature [Enabled] 116
Memory Hole [Disabled] 116
Initiate Graphics Adapter [PEG/PCI] 117

Internal Graphics Mode Select [Enable, 8MB] 117
Boot Display Device [Auto]..... 117
HDA Controller [Enabled] 118
ASF Support [Enabled] 119
Save Changes and Exit 120
Discard Changes and Exit 120
Discard Changes..... 120
Load Optimal Defaults..... 120
Load Failsafe Defaults..... 120

Appendix

B

DIO Interface

B.1 DIO Interface Introduction

The DIO connector on the KINO-9654G4 is interfaced to GIO ports on the iTE Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the iTE Super I/O chipset.

B.2 DIO Connector Pinouts

The following table describes how the DIO connector pins are connected to the Super I/O GPIO port 1.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

B.3 Assembly Language Samples

B.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

```
MOV     AX, 6F08H     Sets the digital port as input
INT     15H           Initiates the INT 15H BIOS call
```

B.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

MOV	**AX, 6F09H**	Sets the digital port as output
MOV	**BL, 09H**	
INT	**15H**	Initiates the INT 15H BIOS call

Appendix

C

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. IEI support is contacted or the IEI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table C-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT      15H
 ;
; ADD THE APPLICATION PROGRAM HERE
;
        CMP      EXIT_AP, 1     ;is the application over?
        JNE      W_LOOP         ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT      15H
;
; EXIT ;
```

Appendix

D

Hazardous Materials Disclosure

D.1 Hazardous Material Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	x	O	O	O	O	x
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
电池	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。